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WINDOWS 8 HARDWARE

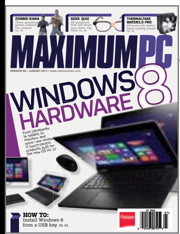
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Gordon Mah Ung

IT'S TIME TO UPGRADE, DAD

ONE OF THE coolest things about getting your ugly mug plastered in a national magazine is that you can get a message out to lots of people—and sometimes, to just a few, or even one, in particular. My message this month is that it's time to upgrade your PC.

Specifically, I mean you, my father-in-law who loves gadgets and electronics more than I do. Since you read the magazine, I figured this would be good way to give you the hint.

In early 2011, you bought a new iPad 2. About a year later, you decided it was too damned heavy and gave it to my mother-in-law (who, incidentally, is no longer in the Circle of PC Tech Support since she replaced her 8-year-old Dell Dimension desktop with a new iMac). You then went out and bought a Samsung Galaxy Tab 2 7-inch. Of course, six months later, you ditched the Galaxy Tab 2 for a new iPad Mini.

I bring all this up because while you've upgraded tablets three times in the space of two years, you are still rolling that Dell 17-inch laptop you bought, I dunno, seven years ago?

Along the way, I've added RAM to that old Inspiron 6400 and swapped the hard drive for a larger one. A couple of years later, I swapped the 1.66GHz Core Duo T2300 for a 2.33GHz Core 2 Duo T7600, put in an even larger hard drive, and moved you to 64-bit Windows 7 (the original Core Duo does not support x86-64). Yes, I know, the screen started to go on the fritz (which I swear it was doing before the processor upgrade), but rather than us rushing down to the Internet to replace it, you folded the monitor all the way back, covered it with a piece of plywood and just plopped an LCD monitor on top of it.

It's not like the laptop hasn't served you well. You burn CDs and DVDs with it constantly, do desktop publishing, edit vacation pics, and create reunion slide shows. Whenever I visit, it's usually being used along with the tablet.

I know, I know, you asked for recommended specs on a new laptop and were holding off to see if Win8 is worth getting with a touchscreen laptop and you wanted me to go to the store with you, but you do seem pretty content with the plywood laptop.

So tell you what, during the Christmas break, let's set a date to specifically drive down to the big box store and pick up a shiny new laptop for you. Not some cheapo $500 deal, either—but a nice, fast laptop that'll cut your video transcoding by two-thirds, boot in 10 seconds, and launch apps without you having to drum fingers on the plywood. And maybe next time, you won't stretch the upgrade cycle out quite so long. Maybe one laptop every three tablets, perhaps?



Gordon Mah Ung is Maximum PC's deputy editor, senior hardware expert, and all-around muckraker.

submit your questions to: comments@maximumpc.com



THE NEWS

Has Apple Jumped the Shark?

Falling stock prices, troubling product miscues, and a changing of the guard raise questions about Apple's reign

ON THE SURFACE, Apple looks as delectable as ever: No tablet has ever come close to toppling the iPad, MacBooks outsell all other laptop lines, the iPhone alone makes more money than Microsoft, and the company has enough cash on hand to buy a functional space station and 15 or so Instagrams. It's nice at the top, eh?

But beneath those jaw-dropping stats, there are hints of a deep-seated rot starting to take root, coaxing the company's stock to drop a whopping 20 percent in the month after the iPhone 5's release. Has Apple jumped the shark?

SO GOES THE IPHONE, SO GOES APPLE

It's no coincidence that Apple's stock plunge coincided with the launch of the iPhone 5. The latest and greatest iPhone may be a model of modern engineering—thin and powerful and 4G-fast—but it's also been plagued by un-Apple-esque design flaws. The decision to dump Google Maps and go with an error-plagued in-house alternative proved disastrous from both a usability and PR standpoint, ultimately culminating in an open letter of apology by CEO Tim Cook. Smaller issues abound, including Wi-Fi connection issues and the easily scuffed aluminum chassis.

"Product mistakes that Jobs himself would have caught are getting through to customers," says Rob Enderle, principal analyst at the Enderle Group.

Nevertheless, Apple still sold more than 5 million iPhone 5s over the handset's launch weekend. That sounds impressive, but analysts expected as many as 10 million units to move.

Making matters worse, Apple's manufacturer can't keep up. "It's not easy to make the iPhones," Foxconn head Terry Gou told reporters in November. "We are falling short of meeting the huge demand."

TOO MUCH, TOO FAST

Supply chain management is supposed to be Tim Cook's strong point. What gives? Stuffing so much firepower into the iPhone 5's incredibly lightweight frame no doubt contributes to the manufacturing woes, but analysts also think that Cook's Apple may simply be biting off more than it can chew, hardware-wise. The company was known for its measured, year-round product announcements under Steve Jobs, but this year, Apple announced the iPhone 5, a 13-inch MacBook Pro with Retina Display, an overhauled Mac mini, a tweaked fourth-generation iPad, and the long-awaited iPad mini in a span of a month and a half.

"[Tim Cook] has started doing Compaq-like big-bang launches where the company barfs out large numbers of products at once and doesn't have the resources to drive sustained demand on any of them," Enderle says.

JOBS ON THE LINE

Cook also shook up the senior management structure in recent months. Notorious firebrand, longtime Steve Jobs loyalist, and iOS software chief Scott Forstall got the boot after allegedly refusing to sign the Maps apology letter, while retail head John Browett left after a series of embarrassing staffing gaffes at Apple Stores.

"Apple is becoming a very different company," Enderle says. "Tim Cook is reforming the executive team to better assure loyalty, but it broke the tension Jobs brilliantly maintained between design and software engineering, creating an imbalance."

A peaceful workplace is a happy workplace, but is it an innovative and passionate workplace?

THE END OF AN ERA?

Make no mistake: Apple isn't disappearing any time soon, if only because it's sitting on a bigger cash stockpile than Smaug ever dreamed of. Without Steve Jobs, however, the company's reign at the top is starting to look a lot more middle-managerial than magical.

"Apple's rise was meteoric but the fall will be slow," says Patrick Moorhead, president and principal analyst at Moor Insights & Strategy. "It's not a question of 'if,' but only 'when.' Apple will continue to create very high-quality products, but they lack the decision-making process, style, and leadership that got them to where they are today."

In other words, there was only one Steve. **–Brad Chacos**

Image credit: Apple.com



People love the iPad mini, but could its lower gross margins and supply chain stress actually hurt Apple?



AMD Faces Drumbeat of Bad News

It's hard out there for a chip; just ask AMD. The once-dominant silicon-slinging operation has fallen on tough times lately, and the company's media feed reads like it's being run by Debbie Downer herself. To wit, this month it was reported that the company was cutting up to 15 percent of its staff in reaction to a 25 percent drop in income year-to-year. Its loss of income and subsequent revenue warning ignited a sell-off of its stock, causing the price to drop to a three-year low. As of this writing, it's selling for $1.87 per share. Amid all this, its CFO resigned to "pursue other opportunities," its "Vishera" CPU debuted to lukewarm reviews, and the company brought in advisors from J.P. Morgan to help it explore its strategic options. Would those options include a sale, perhaps? According to an AMD spokesman, no, it is not "actively pursuing" a sale at this time. That's great news—we certainly hope that it's actively pursuing a miracle then, because it's going to need it. **–JN**

Digital Game Sales Offset Physical Media Declines

It's always perplexing to us when research groups release game-related sales figures that completely ignore digital downloads, especially on the PC. For that reason, we're thrilled that the NPD Group left no stone unturned in tallying $2.87 billion spent on game content in the United States in the third quarter of 2012.

Content in digital format (full game and add-on content downloads, subscriptions, mobile games, and social network games) generated $1.40 billion, surpassing the $1.07 billion U.S. consumers spent on new physical video and PC game software. Other physical forms of content (used games and rentals) added up to another $399 million. "Despite declines in physical format spending of 16 percent from Q3 2011, strong growth in digital format spending, up 22 percent, helped offset this decline and led to 1 percent decline in content spending from the same quarter last year," said NPD analyst Liam Callahan. **–PL**

Intel Takes Victory Lap with New Hexa-core

Don't look now, but Intel just pulled a Sharpie out of its sock and signed the football it caught in the end zone. Yeah, it's not sporting, but that sums up the company's release of its new hexa-core 3.5GHz Core i7-3970X chip.

The new chip is 200MHz faster than the previous champion: the hexa-core 3.3GHz Core i7-3960X. The 3970X's max Turbo of 4GHz also bests its predecessor's by 100MHz. Besides the incremental clock speed differences, the $1,000 chip is internally the same, but does up the thermals to 150 watts over the 130 watts of the older $1,000 Extreme chip. **–GU**





Tom Halfhill
Fast Forward

GRAND UNIFICATION THEORIES

WHEN YOU'RE ON top of the world, nothing seems impossible. By market capitalization, Apple is indeed on top. Now it's rumored that Apple is designing ARM-compatible processors to replace the Macintosh's Intel x86 processors, which would unify Apple's entire product line around one CPU architecture.

This rumor follows another that Apple is porting its mobile operating system (iOS) to the Mac, which would unify the company's product line on the same system software. And then Apple would merge its app stores, vending all software from a unified online storefront.

Although these rumors could be true, they gloss over the technical challenges. For instance, nobody—including ARM—has yet designed an ARM-compatible processor that matches the performance of Intel's best PC processors. Heck, ARM only introduced a 64-bit architecture last year, and the first 64-bit ARM chips are still in development.

Although it's possible to design a high-performance ARM processor, I am skeptical it will be much more power efficient than an x86. Intel still has a four-year lead in fabrication technology, which is a huge advantage. If the ARM chip isn't significantly faster and more power efficient, why switch?

Porting Mac software to ARM is another challenge. But Apple has successfully changed architectures twice before: from 68000 to PowerPC in 1994, and from PowerPC to x86 in 2005. No other company does emulation better.

Unifying the operating systems is more sensible than unifying the CPU architectures. However, Apple has already spent $500 million designing a successful ARM processor for iOS and may feel confident that it can design an ARM-compatible Mac processor, too. The idea is feasible but audacious—just like something Steve Jobs would have set in motion during his last days. With Apple's $121 billion cash reserve, it's a gamble the company can afford to make.

Tom Halfhill was formerly a senior editor for *Byte* magazine and is now an analyst for *Microprocessor Report*.



Thomas McDonald
Game Theory

THE OBSOLESCENCE OF A CLASSIC

X-COM (1994) is without question one of the great electronic games of all time. And after breaking from XCOM (2012) to spend a long, sad hour with its predecessor this week, I never want to play the original again.

Design has moved along, and what worked in 1994—what we were willing to tolerate in 1994—just doesn't work any more. I can overlook the graphics, with some effort. But in comparison to the remake, the pacing is languid, the drama more muted, and the controls intolerable.

The simple fact is this: Those great old games you remember? Many of them were only great for their time, and that time has passed. Design has improved. We understand more about pacing and control. XCOM leaves out the boring, clunky bits: Things are tighter, fresher, more dramatic. And that's a good thing.

Civilization sequels were evolutionary works created under the supervision of the original designer. X-Com does not have this. Julian Gollop has not nurtured a sequence of evolving X-Coms over the past 18 years, and he was not involved in the new project. This is a new creative team doing a cover version of someone else's song, but a cover version that absolutely obliterates the need for the original.

The 1994 X-Com is now no more than a museum piece, which brings us to the key problem: If a beloved creative work can be rendered completely obsolete by a subsequent work, what becomes of the original?

No one is repainting the *Mona Lisa* and no remake of *The Godfather* will ever render the original obsolete. Those are immortal works. X-Com itself—like all games—is not immortal, even if its memory and influence is. And in five years, maybe someone will make something better than XCOM, rendering *that* obsolete. It's a problem at the heart of my objection to "Games as Art." Great art becomes *more* valid and important as time goes on, not less.

You can follow Thomas McDonald on Twitter: @StateOfPlayBlog.

Samsung Denies Apple Price Hike

It seemed like the war between Apple and Samsung was intensifying when the *Wall Street Journal* reported that Samsung was jacking up the price on the mobile processors it supplies Apple by 20 percent. Such a move seemed in line with the contentious back-and-forth that has characterized the two companies' relationship, including the lawsuit and countersuit over patents that resulted in a $1 billion dollar judgment against Samsung. But apparently, a revenge price hike is not in the works, at least according to Korean newspaper *The Hankyoreh*. It reported that an unnamed Samsung executive denied the price-hike rumors. Perhaps Samsung thought better of burning that bridge. **–KS**

Microsoft to Skip SP2 for Win7

Windows service packs have always been an IT pro's best friend, as they take all the individual updates and hotfixes released by Microsoft and bundle them into one file that's easy to download, and more importantly, easy to deploy. Microsoft has also tucked major updates to its OS into service packs in the past, so we were majorly bummed to hear this month that Microsoft is not planning on releasing Service Pack 2 (SP2) for Windows 7 users (SP1 came out earlier this year). Microsoft hasn't given a reason why, but with the recent launch of Windows 8 we can read between the lines well enough. At least we'll still get Win7 updates for a few more years. **–JN**

Microsoft Shakes Up Windows

If you need a movie analogy to explain the latest turmoil at Microsoft, just think of the constant standoffs in Quentin Tarantino's *Reservoir Dogs,* where no one can have a conversation without pointing a gun at someone's head. Yeah, those were the Monday morning meetings at Microsoft, but without the cool skinny ties.

At least, that's one of the reasons being leaked to the media for why top OS caporegime, Steven Sinofsky, was forced off the Microsoft bus and under the front wheel. The move was surprising, as it came just shortly after Microsoft launched its new operating systems, Windows RT and Windows 8, and its own computer, the Surface RT.

Even more surprising, Sinofsky had been thought by many to be the man to take over once Steve Ballmer resigned. Sinofsky was credited with turning the OS unit around and delivering Windows 7 after the debacle of Vista. He was also the main driver behind the controversial Windows 8 operating system. But Sinofsky is said to have alienated and forced out others in the Microsoft empire, including the powerful Office division, which brings home most of the bacon.

The lack of unity can be seen in Windows RT, which is sorely lacking a Modern UI version of the Office suite. But divisions have existed apart from Sinofsky. Case in point: When Windows 7 Phones first shipped, they didn't work with Exchange because the phones didn't support device encryption—something Android and iOS phones supported. We'll see if Sinofsky's departure heralds a changed culture. **–GU**





Quinn Norton
Byte Rights

PRACTICING PRIVACY ONLINE

I'VE BEEN HOLDING forth about you rights online now for ages—at least 28 Internet years, which are like dog years, but with more porn. But rights are like muscles, they don't do much if you don't exercise them. We have a right to encrypt our communications online, which protects our privacy. Most of us don't use encryption to communicate though, since using encryption tools is slightly less fun than playing mumbletypeg with your own eye.

The one form of encryption that's easy to use is common enough that we often don't realize we're using it. It's SSL, the web encryption that shows up as https (instead of http) in website addresses—you may also know it from the closed lock icon. Https is what we use for financial transactions much of the time. But it's also good for just keeping your online life to yourself.

Most of us don't know which websites serve https, and often don't know to use it even when a website makes encryption available. To help with this, the EFF has created a browser plugin for Firefox and Chrome called HTTPS Everywhere. HTTPS Everywhere (which you can get from the EFF website) will automatically encrypt your access to over 1,400 sites. While 1,400 is far from everywhere, that number includes some of the most popular sites, like Google and Twitter. That 1,400 doesn't include Yahoo, because Yahoo doesn't offer an encrypted web option. If you use Yahoo, this would be a great time to tell them you'd like your privacy, too. This is the kind of complaining we need to do more of to exercise those rights.

It's not just governments we need to talk back to. The websites that hold our data owe us our rights too, but they won't know you care if you don't ever tell them.

Quinn Norton writes about copyright for Wired News and other publications.

Gesture Tracking Gets a Boost with Windows 8



Hardware and software from two companies promise "touchless gesture" tracking for the Modern UI in Windows 8, though neither company has brought a product to market just yet. Elliptic Labs (www.ellipticlabs.com) is coming to market with a hardware solution that would be built into a laptop, tablet, or smartphone, and use ultrasound sensors to create a box around the PC that you can use to control your machine. This will be a feature that comes with a Windows 8 laptop—you can't just add it on. If you wanted to add something like this to your existing laptop, you'd need a solution like the Leap (www.leapmotion.com), which is a USB dongle that creates an 8x8-foot square you can stand inside and go all *Minority Report*. The Leap costs $70 but smacks of vaporware to us because it seems too good to be true. That said, we can't wait to try one if they ever materialize. **–JN**

MS Office Coming to Android, iOS

Microsoft is reportedly in the process of porting its Office productivity suite over to iOS and Android devices. This isn't the first we've heard of Office Mobile, nor has Microsoft officially confirmed the news, but screenshots and inside information have all but tipped the release as imminent. It will ship first to iOS and then Android, starting in early 2013.

Citing "several sources close to Microsoft's plans," The Verge website reports that Office Mobile will initially be offered as a free app that allows iOS and Android users to view Microsoft Office documents (Word, PowerPoint, and Excel). Those with an Office 365 subscription will be able to edit documents in Office Mobile, and there will be an option to purchase a subscription from within the app. **–PL**

Overclocker Pushes RAM to 3,900MHz

Memory maker G.Skill is laying claim to the "world's fastest RAM" after an overclocker goosed the company's TridentX Extreme Performance memory kit to 1,950MHz (3,900MHz effective). Whether you want to qualify that as the world's fastest RAM is up to you, but it is a new memory-frequency world record.

Overclocker Christian Ney achieved the world record just a few days after another overclocker, HiCookie, first broke the record with the same kit. HiCookie achieved 1,677MHz (3,354MHz effective) using a Gigabyte Z77X-UD4H motherboard and Intel Core i7-3770K processor.

Ney trumped HiCookie's frequency using an AMD system with a Gigabyte GA-A75-UD4H motherboard and an AMD A8-3870K processor. In both cases, a healthy dose of liquid nitrogen was required to keep everything cool. **–PL**



THE LIST

SIX PIECES OF PC LEGACY HARDWARE YOU CAN STILL BUY NEW

6 ACCELERATED GRAPHICS PORTS (NOT ADVANCED)

PCIe 4.0? Feh. You can still buy a new, boxed 4x AGP video card today, sonny.



Photo courtesy of Niels Olson

5 MICE WITH BALLS

Miss pulling lint out of your ball crevices? Go buy yourself a wheel mouse.



Photo Courtesy of Andy Melton

4 CRT MONITORS

These are getting rare as hens' teeth, but it's hard to believe you can still buy a new CRT in 2013. Get 'em while they last.



Photo Courtesy of Steve Rainwater

3 FLOPPY DRIVES

We don't know if the 110 reviews on Newegg.com for the internal floppy drive are real or if people are trying to start a new Three Wolf Moon craze.



Photo Courtesy of Abbydonkrafts

2 IDE OPTICAL DRIVES

Nostalgic for IDE cable origami? Now you can relive those days with a new IDE optical drive and 80-pin conductor cable!



Photo Courtesy of Warrenski

1 PS/2 KEYBOARDS

The PS/2 port was considered legacy in 2000, yet 13 years later you can still buy a fresh-smelling PS/2 keyboard.



Photo Courtesy of Carsten Lorentzen

HEAD TO HEAD

BY BRAD CHACOS

Spotify vs. Xbox Music

Love or hate Windows 8, you have to give Microsoft credit for its tenacity. Most companies would've tucked their tail between their legs and run home crying after the disaster that was Zune, but Microsoft doubled down to bring a better-than-before effort rebranded as Xbox Music to its Live Tile–equipped ecosystem. With unlimited music streaming and the ability to buy individual tracks, Xbox Music looks like a hit on the Surface. (Get it?) But how does the new contender stack up to Spotify?

Round 1: Music Catalog

Device support and ease-of-use are important, but when it comes down to brass tacks, the real reason to subscribe to a music service is for, well, the music. Xbox Music and Spotify stand neck-and-neck if you plan on sticking to streaming, with each offering around 18 million on-demand songs. Even the coverage gaps are largely similar; neither service streams Pink Floyd, The Beatles, or Led Zeppelin, for example.

Xbox Music earns the nod here because many of the artists that aren't available for streaming can nevertheless be downloaded (after being paid for) as stand-alone albums and tracks, in à-la-carte iTunes fashion. Spotify doesn't match that ability, but Microsoft's advantage doesn't matter if you're only interested in streaming songs.

Winner: Xbox Music

Round 2: Pricing

With all tunes being equal on the selection front, let's take a look at pricing: Which streaming service dishes out dirty deeds dirt cheap? Again, it's a close call. Disregarding the à-la-carte Xbox Music Store downloads, a full subscription to either streaming service costs $10 per month, and each offers up free and unlimited ad-supported listening, as well.

Spotify shines in the details, however. The old hand offers truly unlimited ad-supported listening, while Xbox Music says its free ride drops to a fixed number of monthly hours after half a year of rocking out. Spotify also offers a $5/month plan for listeners who want to ditch the ads on their PC client but don't want the full subscription's mobile and home theater device support.

Winner: Spotify

Round 3: Device Support

Speaking of device support, people who haven't drunk the Microsoft Kool-Aid need not apply at Xbox Music. The service's native Windows 8 inclusion is a killer feature that services like Spotify and Pandora can only dream about, but Xbox Music's non-PC support is limited to the Xbox 360 and the Windows Phone 8 handsets—you know, the phone platform that isn't selling any units. Microsoft promises Android and iOS support will pop up sometime in the next year, but Windows Phone 7 and Windows 7 users will be stuck with Zune Marketplace forever.

Or, more likely, Spotify. Spotify works with Windows 7 and Windows 8 alike, while a $10 premium subscription opens up streaming to all the major mobile phone platforms and several major home theater electronics.

Winner: Spotify

Round 4: Audio Quality

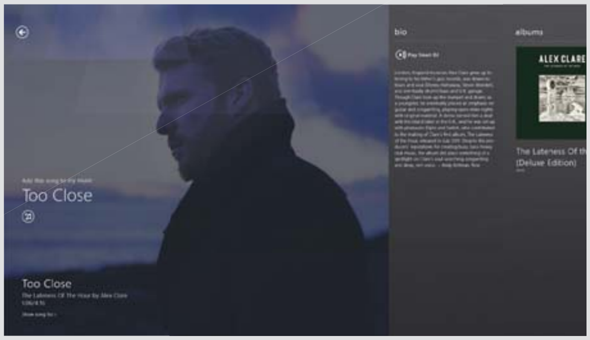
Which service delivers sweeter sounding music to listeners' ears? When it comes to free music streaming, the answer is neither. Xbox Music's 192KB/s tunes technically outgun Spotify's 160KB/s stream, but both sound equally ho-hum to the indiscriminate ear: neither horrible nor noteworthy.

Xbox Music's pay-per-download tracks offer a better listening experience at 256KB/s, but streaming music maestros will want to check out Spotify's $10 premium service, which slings out its dulcet tones at a sultry 320KB/s. Internet-based music quality doesn't get any better than that. (Be sure to keep a close eye on your data usage on mobile devices, though!)

Winner: Spotify



Spotify ain't purdy, but the janky UI hides powerful control options, including a bevy of handy-dandy apps.



Xbox Music focuses on its oh-so-attractive design to the occasional detriment of usability. "Too Close," indeed.

Round 5: Interface

We really, really wanted to give this round to Xbox Music. The Modern-style app delivers appealing visuals in spades, whereas Spotify's cluttered black interface gives us the heebie-jeebies every time we gaze our tired eyes upon it.

Despite Xbox Music's beautiful facade, however, Spotify's clutter makes it much more useful in everyday practice. A fountain of information hides in the abundant options littering the left-hand column, searching works great, and there's an array of advanced tools you can use to become a true Spotify power user (see our Spotify Cheat Sheet at bitly.com/pF6DUF).

Xbox Music simply sacrifices too much navigational ease in order to look pretty and pimp paid downloads. On the other hand, we like that those paid downloads seamlessly fuse with your favorite streaming tracks in the My Music section.

Winner: Spotify

And the Winner Is...

It may not be pretty and it may not be new, but after winning four of the five rounds here—and tying in the fifth if you're only interested in streaming—**Spotify** is definitely still the champ, emerging unscathed in two hard-fought heavyweight bouts. (See the Rdio K.O. at bit.ly/uLzOab.) Xbox Music is a deep and stylish option for Windows 8 users, but pretty much *only* Windows 8 users; that won't cut it against the champion.

DOCTOR

THIS MONTH THE DOCTOR TACKLES...

> CPU Temperatures
> Dual-Booting 7 and 8
> Hybrid Drives for Gaming

Will My GPU Support Touchscreens?

I want to build a PC based on your Midsize Menace (Build It, June 2012), except with 32GB of RAM, an Asus GTX 670 DirectCU TOP video card, and Windows 8. My questions revolve around the touch-screen user interface. Will the Asus GTX 670 drive dual touchscreen monitors with the ports it has, and what is the difference in types of monitors?

—Clayton Lieck

THE DOCTOR RESPONDS: The touch capabilities of most monitors are not driven by the graphics card. Instead, a USB connection sends touch and location data from the monitor to the PC. The Asus GTX 670 supports up to four monitors: two DVI, one DisplayPort, and one HDMI. It will run two touchscreen monitors (or any other monitors) without a problem as long as they have the correct inputs and you have two free USB ports. As for the type of monitor to get, you'll want a projected capacitive monitor with multitouch capability, which won't be cheap. Most affordable touch monitors today use infrared, which is more limited in resolution and multitouch capability than capacitive. Microsoft requires at least five-point multitouch in order for a device to be certified for Windows 8, so you should look for a monitor that is advertised as Windows 8–compatible. You'll also want one with a flush bezel, as many Windows 8 touch features rely on being able to swipe onto and off of the edge of the screen. A prominent bezel will interfere with that.

See our reviews of two capacitive touchscreen monitors for Windows 8 on page 30.



Dell's S2340T is one of the new multitouch monitors optimized for Windows 8.

CPU Temp Differences

I am running an AMD Phenom II X6 1090T CPU overclocked to 3.9GHz on an MSI 970A G45 board, a Zalman CNPS9900 cooler, 8GB of Corsair Vengeance RAM, and an AMD Radeon HD 6950 video card.

I noticed the core temperatures in your review of the Cooler Master Hyper 212 Evo (April 2012) and was curious as to why mine run much lower. Running Prime95, my burn temps never exceeded 58 degrees Celsius and my idle temps are always running around 28 C, both according to CoreTemp. When I saw the temperatures of your test machine's Core i7-3960X my first thought was that it was terribly close to what I consider the maximum safe operating temperature of 80 C. Does this CPU simply run that hot?

I have run my test several times during the tweaking process of my CPU and the temperatures really haven't changed very much. During my test all six cores of my 1090T are at 100 percent load. Why so much difference?

—Richard Gray

THE DOCTOR RESPONDS: There are several reasons why you're seeing different burn temperatures on your CPU than we are on ours, Richard. The first is that they are different CPUs. The Phenom II X6 1090T is an AMD processor and has a slightly lower thermal design profile (125W versus 130W). Intel's chip also now features advanced power control units that closely monitor the power consumption and thermals of the cores. The Doctor believes this lets Intel push the chip harder, too. Intel processors generally have a higher safe operating threshold; they can go to around 90 C before they'll start throttling themselves down to prevent damage. AMD CPUs should generally be kept under 60 C

↘ submit your questions to: doctor@maximumpc.com

or so. Also remember that each company's TDP ratings and thermal specs are difficult to compare directly.

Then there's the difference between the function of your PC and our test bed. Your PC is a day-to-day machine, while ours is designed to run the CPU as hot as possible to better highlight the capabilities of the CPU coolers we test. Our CPU is overclocked and overvolted and subjected to an internal Intel stress-testing tool that heats up CPUs far more than any publicly available tool that we've seen. The stress-testing tool is designed to heat up all circuits of the chip while most public stress tests can't do that. In day-to-day use, the Core i7-3960X runs far cooler.

Dual-Boot Windows 7 and 8

I have a PC with a 1TB hard drive. I want to buy an SSD and install Windows 8 on it. Will I be able to choose which drive the PC boots into? I have been searching for the answer as to how to do this, with no success.

—Preetham Grandhi

THE DOCTOR RESPONDS: Microsoft actually makes it really easy this time. All you'll have to do is install the SSD into your machine and boot your PC from the Windows 8 install disk. Install Windows 8 onto the SSD. Once you've gone through the setup process, Windows 8 will throw up a screen asking you to choose which OS to boot into by default. From now on, if you don't pick the other OS at that screen during startup, your PC will boot into the default.

Clean Update from XP to 8?

I have been holding the line for quite some time with a Windows XP system that I have primarily used to play WOW, but with the lower-dollar upgrade cost to Windows 8, I am looking at diving in. If I purchase the Windows 8 upgrade, based off my Windows XP license, am I then able to do a full install from scratch, or does it require that I have XP installed first and then pop in the Windows 8 disk? I was looking at building a new system, and thought this might be a cheap way to get to a more current OS, and retire the old girl to the pasture. What I do not want to happen is to actually have to load XP on it first.

—Adam Menossi

THE DOCTOR RESPONDS: Adam, in order to take advantage of the Windows 8 upgrade you will need to install it on a computer that has a genuine copy of XP, Vista, or 7 already installed. The old workarounds won't work now that you can't skip activation on install. You can and should do a clean install, but you will need to leave the XP install intact. The Windows 8 install process checks for a valid Windows key on the existing hard drives during installation and won't activate if it's not there.

Microsoft sells System Builder licenses for new systems, but those are significantly more expensive than upgrade copies. If you want to build a new system but use upgrade media, you'll have to install and activate your copy of XP first, which may involve a call to Microsoft to reactivate the key. It's a bit of a pain, but so is spending $140 for a new license.

Hybrid for Gaming?

Would using a Seagate Momentus XT hybrid as a secondary hard drive be a good idea? I am not able to upgrade my 256GB primary SSD at this time, and would like a fast drive to use for storing my games.

—Chris Phenecie

THE DOCTOR RESPONDS: Yes, with some caveats. First, it will generally only be as fast as a normal Seagate Momentus of the same capacity: Speedy, but not SSD-speedy everywhere. This is because it only has 8GB of NAND cache. Seagate's caching algorithm copies the most frequently used sectors to cache, so the stuff you use often will feel a heck of a lot faster. If you play the same few games regularly, their load and startup times will decrease. If you tend to play one game at a time for weeks and weeks, it will load and start up much faster, as well, after you've played it a few times. You won't get the universal speed boost you'd get from having everything on SSD. Still, the extra NAND can only help with frequently accessed content, so it's a decent choice for a gaming hard drive.

SLI or Single?

Doc, my rig is a 2.6GHz Core 2 Quad with 8GB of RAM and a pair of GeForce 8800 GTX cards in SLI, booting from a 750GB Seagate Momentus XT hybrid. I want to upgrade my GPUs and am wondering if I'd be better off pairing a couple GeForce GTX 660 cards or buying a single 680. Both options cost about the same. I plan on completely rebuilding this machine after the holidays, keeping only the video cards and hybrid drive. Until then, my objective is to be able to play Skyrim on the highest settings; currently it barely runs on the lowest.

—Eric Long

THE DOCTOR RESPONDS: Nine times out of 10, our advice is to buy the single-fastest video card your budget can afford, rather than two cards. If you buy two GTX 660s, the only way to upgrade is to add a third GTX 660, or throw out both cards. If you get a GTX 680, you can add another one down the line if you want to upgrade. That said, two GTX 660s in SLI will be faster than a single GTX 680. But a single GTX 680 will be more than enough to run Skyrim on its maximum settings. Of your two choices, we say go for the GTX 680.

Time for Some Spring Ripping

In my constant quest to declutter my life, I recently realized I have a lot of DVD movies taking up a lot of space. I was wondering if you have any recommendations on how to convert these into a digital format that I can store on my computer. I'm familiar with DVD rippers, but there are so many choices that I don't know which is best. Any suggestions?

—Chris Hilland

THE DOCTOR RESPONDS: The doctor is a huge fan of Slysoft's AnyDVD (www.slysoft.com/en/anydvd.html), which you can buy for about $64 with two years of updates, or $90 with lifetime updates. AnyDVD HD allows you to also rip Blu-ray discs that you own, but if you are only going to rip DVDs, the standard version is fine. AnyDVD will let you rip the contents of discs you own to your hard drive, but they do take up a lot of space. So the Doc recommends also running the free transcoder HandBrake (www.handbrake.fr). If you point it to your DVD drive, it will transcode the video files after AnyDVD has removed the copy protection, saving you a lot of storage space. The video quality is excellent and the program is multithreaded, so it won't take a year to convert a video. There are several different presets you can choose from but for hard drive storage, High Profile is fine. If you're price averse, you may want to try the free DVD43 decryption tool (www.dvd43.com). It's not in the same league as AnyDVD, but it's free.

BY KATHERINE STEVENSON, GORDON MAH UNG, AND TIM FERRILL

WINDOWS 8 HARDWARE

MICROSOFT'S RE-IMAGINED OS IS ONLY HALF THE EQUATION





As has been reported exhaustively by now, Windows 8 can be a very unsettling experience for longtime Windows users. It's like going to visit your parents and finding dad decked out in drag. The person you've known for so long is still there, but a new, unexpected element to his persona has you flummoxed and fumbling for how to behave.

The big, blocky, colorful, touch-centric Modern UI (the official name, according to Microsoft) seems about as natural to a desktop jockey as seeing pops in a bouffant blonde wig and a body-hugging velour pantsuit. But while adjusting to dad's new way of life could take considerable time, and possibly therapy, adapting to Windows 8 might simply be a matter of having the right hardware.

Windows 8 is a new OS for a new way of computing. Obviously, mobile is a big part of that. Microsoft's Surface RT tablet as well as a host of portables combining tablet and notebook qualities in one have been built expressly with Windows 8 in mind. But there's also hardware that makes Windows 8 more agreeable for tower users—touchscreen monitors, touchpads, Win8-optimized mice and keyboards. On the following pages we take a look at several of these products to determine which ones succeed in making sense of Windows 8.






Start
Justin
Harrison
ideapad
Logitech

MICROSOFT SURFACE RT

Software giant takes on tablets

MICROSOFT IS THOUGHT of only as a software company by most, but people often forget the company's long string of hardware victories over the years, such as the Xbox 360, as well a line of award-winning and coveted mice, game controllers, and keyboards.

Frankly, we think you can add the Surface RT to that list of impressive hardware pieces. The Surface RT exudes luxury with its stylized and solid-metal case, clever kickstand, magnetic power connector (a first on a tablet that we know of), and innovative keyboard cover.

Windows RT—the pared-down Windows 8 OS in the Surface RT—and its Modern UI (née Metro), makes for a truly unique (god help us) "reboot" on how you interface with a touch-enabled computer. Yes, by bucking the rows of icons we've used for years now to interface with touch, the learning curve is steeper, but there's something enjoyable and refreshing about Windows' new tiled UI.

For hardware, the Surface RT packs an Nvidia Tegra 3 part clocked at 1.4GHz, 2GB of LP-DDR3, 32GB (or 64GB) of storage, front and rear cameras, and a 10.6-inch 1366x768 screen. Given the RT's premium price, Microsoft has taken dings for the screen's resolution. With the fourth-gen iPad's resolution at 2048x1536 and the Nexus 10's at 2560x1600, it's no surprise that people see the relatively low resolution of Surface RT as a minus. In practical use, it won't kill you, but there will be times when you wish the Surface RT had a few more pixels to smooth things out.

Performance of the Surface RT is difficult to gauge, as there are no standardized benchmarks that can be run outside of the browser on the iPad, Nexus, and RT. We did run several browser-based benchmarks, but obviously, you're not getting that close to the metal and each platform's browser has a significant impact on performance. If pushed to make a call, we'd say it's a split in the numbers game, as each device won at least one benchmark. Using our Mk. 1 eyeball as a benchmark, the Surface RT didn't feel slow in the apps we tried and the scrolling seemed creamy-smooth—



A clever kickstand lets you stand up the Surface RT for movie viewing or typing on the optional keyboard.



The Surface is sexy-thin and its hard angles are refreshing in a world of soft-round-cornered gadgets.

certainly better than the severe stutter we experienced on pre-Jelly Bean Androids tabs. One thing that's apparent, though, are the slow application launches. It takes from five to six seconds to launch the most basic apps, which is unacceptable on a premium tablet. Once cached, it's fine, but the initial launch is s-l-o-w.

While we're harping on hardware, we'll also ding the camera used in the Surface RT. Both front and rear are 720p, which is pretty sad in this day and age, but maybe that will dissuade people from embarrassing themselves by using the tablet as a camera. Another hardware issue worth mentioning: The 32GB version we reviewed is about half spent on OS storage. That's fortunately mitigated by the inclusion of a MicroSD slot, so an additional 64GB is just one Amazon click away.

The most impressive feature of the tablet is the integrated keyboard cover. Two versions are available: a 5.75mm thick Type Cover that uses mechanical keys and a 3mm Touch Cover that uses membrane "keys" that don't move at all. We purchased the Touch Cover with our Surface RT and initially worried that it would remind us of the Atari 400 keyboard. Surprisingly, it wasn't that bad and we could comfortably type on it once we became accustomed to it. The track pad, however, is too small. Both covers attach via a clever magnetic connector that's strong enough to hold the weight of the Surface RT when picked up by the cover.

Some people have criticized the inclusion of a keyboard as a sign of weakness in the Windows RT OS. We strongly disagree. First, you don't get the keyboard for free—you have to pony up $120 for the Touch Cover and $130 for the Type Cover. Ouch. There's also no strong emphasis on the keyboard in the OS. You can navigate perfectly fine using just touch.

What we do have problems with is the OS. We, again, think Modern, or whatever you want to call it, is a refreshing and futuristic take on a touch interface, but Windows RT is marred by minor irritations such as nonuniform controls in the applications (some apps feature a back button, and some don't) and difficultly controlling some aspects of the OS. Our biggest complaint, though, is that portions of the OS aren't finished. For the most part, 90 percent of the OS is in the fat-finger-friendly Modern UI. But doing something as common as changing the power mode drops you into the desktop mode. And while still surprisingly easy to manipulate with your finger, the desktop mode is jarring—why, in a touch-centric device, would you force someone to use a non-touch UI? It's just surprising to us that Microsoft relegates so much of

Two keyboard options are available: a "real" keyboard (seen here) and a membrane keyboard that actually isn't Atari 400–bad.



the control in Surface RT to the desktop mode. Want to use basic calculator functionality? Do it desktop mode.

From what we can see, Windows RT is just a recompile of Windows 8 for ARM. Want a DOS box? Got it. Manually make regedit changes? That's there, too. It's simply mind-blowing for anyone coming from the four rubber walls of iOS, or the slightly less confining environs of Android. Don't get us wrong, we like command lines and tweaking the guts of an OS and we know it's there in iOS and Android, too—it's just a little disconcerting to have it so prominent in Windows RT.

We suppose there's some strength here. If a large company could port its custom Win32 app to Windows RT, the desktop mode would be a seamless way to transition to a tablet. Unfortunately, apparently only Microsoft has permission to install applications for the desktop mode, so what's the point of even having it? To us, this makes the real competition for Surface RT its x86-based brothers. With the barren shelves of the Metro app store, x86-based Windows 8 tablets at least give you the fallback of millions of Win32 apps already out. With Surface RT and a keyboard at $600 versus a full-on x86-based tablet such as Acer's Iconia W510 hybrid at $750 with a keyboard dock, it ain't pretty.

Ultimately, we're impressed by the Surface RT. Yes, it has some rough spots, and yes, the app store looks like a grocery store after the zombie apocalypse has hit (we expect that to change rapidly), but this is a very good first effort with a lot of potential for those who are willing to risk the burn of being early adopters and are free to think different. **–GU**

VERDICT 8

Microsoft Surface RT

$600, www.microsoft.com

BENCHMARKS

	Surface RT	Nexus 7	iPad 3rd-Gen
CPU	Quad-core 1.4GHz Nvidia Tegra 3	Quad-core 1.2GHz Nvidia Tegra 3 T30L	Dual-core 1GHz Apple A5X
GPU	520GHz Nvidia ULP GeForce	416GHz Nvidia ULP GeForce	PowerVR SGX543MP4
RAM	2GB	1GB	1GB
Screen Size / Resolution / PPI	10.6 inches / 1366x768 / 148	7 inches / 1280x800 / 216	9.7 inches / 2048x1536 / 264
Dimensions / Weight	10.81x6.77x0.37 / 1.5 lbs.	7.7x4.7x10.4x.4 / .74 lbs	9.5x7.3x.37 / 1.44 lbs.
SunSpider JavaScript 0.9.1 (ms)	**982**	1,702	1,519
Google Octane V1	700	**1,307**	881
Futuremark Peacekeeper	366	461	**465**
BrowserMark	80,558	**126,618**	117,980
Microsoft Fishbowl HTML5 / 10 Fish (fps)	23	21	**60**

Best scores are bolded.

LENOVO IDEAPAD YOGA 13

Bend it to your will



The Yoga 13's rubberized surfaces make it a pleasure to hold.

LENOVO GOT A HEAD start generating interest in the IdeaPad Yoga 13 when it demo'd the device at last year's CES. At that time, its unique ability to be both an Ultrabook and a tablet seemed like a far-out concept, today its "convertible" design is the perfect justification for Windows 8—and just one example of a whole new category of portable devices. As the name implies, the Yoga 13 is unusually flexible, able to assume four different positions of functionality, thanks to its special patented double-hinge. In notebook mode it's your standard clamshell; in stand mode the keyboard is rotated back and out of the way, forming a base for the screen; in tent mode the hinge is at the apex, with the screen in front and the keyboard serving as a kickstand; and in tablet mode the screen is flattened against the back of the keyboard. In all instances where the physical keyboard isn't intended for use, it's automatically disabled, with an onscreen keyboard taking its place.

The Yoga's screen is a 13.3-inch 10-point multitouch panel with 1600x900 resolution and the slimmest of bezels, so there's nothing getting in the way of your "swiping" in from the edges in Windows 8 fashion. Regardless of your opinion on touchscreens, you gotta love the fact that IPS panels seem to be the norm here, as opposed to the inferior TN panels that have been typical of standard, non-touch Ultrabooks. It makes sense—a device that's meant to be flipped and turned and viewed from a variety of orientations needs the better image fidelity of IPS. Yay for that.

The screen not only looks good but is very responsive. Even in desktop mode, our touches to the relatively small file/folder names, menu items, and commands were registered with pretty consistent accuracy.

Still, we were more inclined to perform desktop chores the old-fashioned way, and fortunately, the Yoga accommodates with a nice, comfortable keyboard and buttery-smooth touchpad that itself supports Windows 8 gestures. Indeed, as an Ultrabook, the Yoga 13 is pretty nice for the price. We might have been even more impressed if we hadn't just reviewed CyberPower's $850 Zeus M2 last month, which had nearly the same specs but performed 10–20 percent faster than the Yoga in all tests, except Quake III, where the Zeus M2 was 75 percent faster (the Yoga can thank its single-channel RAM for that defeat). Why such disparity between two Core i5-3317Us? The Yoga has a tendency to throttle down under load, presumably to maintain thermal levels.

Be that as it may, you're buying the Yoga 13 for more than just an Ultrabook experience. While a 13.3-inch, three-and-a-half-pound notebook folded back upon itself is pushing the limits of a tablet (as is the sensation of a keyboard on the back), the flexibility offered by the Yoga 13's form factor and touch capabilities has definite uses, not the least of which is giving Windows 8's split personality meaning. **–KS**

VERDICT 9

Lenovo IdeaPad Yoga 13
$1,000, www.lenovo.com

BENCHMARKS

	ZERO-POINT	
Premiere Pro CS3 (sec)	840	1,140 (-26.3%)
Photoshop CS3 (sec)	100	116.3 (-14%)
ProShow Producer (sec)	1,122	1,409 (-20.4%)
MainConcept (sec)	1,901	2,419 (-21.4%)
Quake III (fps)	358.2	250.1 (-30.2%)
Quake 4 (fps)	76.1	59.2 (-22.2%)
Battery Life (min)	250	282

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our zero-point ultraportable is an Intel reference Ultrabook with a 1.8GHz Intel Core i5-3427U, 4GB of DDR3/1600 RAM, integrated graphics, a 240GB SSD, and Windows 8 64-bit.

SPECIFICATIONS

CPU	1.7GHz Core i5-3317U
RAM	4GB DDR3/1600 single-channel
Display	13-inch 1600x900 IPS LCD
Storage	Samsung 128GB SSD
Connectivity	HDMI, USB 3.0, USB 2.0, 2-in-1 card reader, 802.11n, Wi-Fi, Bluetooth 4.0, headphone/mic, 720p webcam, USB-to-Ethernet dongle
Lap / Carry	3 lbs, 6.5 oz / 4 lbs, 0.6 oz

DELL XPS 12

A premium Ultrabook with a twist



The XPS 12 came loaded with top-notch hardware, but no Ethernet port or media reader.

LIKE THE YOGA 13, Dell's XPS 12 is an Ultrabook convertible, but it moves from clamshell device to tablet in an entirely different way. Push in on the lower back of the screen with both hands and it rotates in its frame to face backward—then just close the lid and you have a tablet. We like how this design hides the keyboard from sight, and feel, but we can't help but wonder how the rotating screen and thin metal frame will fare over time and with regular use. Dell says it's been tested to 20,000 cycles.

With its 12.5-inch screen, the XPS 12 is a bit smaller than Lenovo's Yoga 13, but it weighs the same three pounds, 6.5 ounces (without its power brick) as its peer, which again, makes it a more sedentary type of tablet. We're not saying you can't benefit from being able to fold up this Ultrabook, rest it atop your lap, and surf the web from your couch while you watch TV, tablet-style. We're just pointing out that it's larger and more unwieldy than even a 10-inch iPad.

Size issues aside, the XPS 12's 1920x1080 IPS screen is crisp and bright and its edge-to-edge Gorilla Glass coating should make it plenty durable. Capacitive sensors enable prompt response to all the various touches and swipes in Windows 8, even in desktop mode. Dell was kind enough to include a "Getting Started with Windows 8" app in the Modern UI, which explains how to navigate the OS—a feature that's sorely lacking from Windows 8 itself. Like the Yoga 13, the XPS 12's touchpad also supports Win8 gestures, so you can, say, swipe in from the right of the pad to expose the Charms bar, or swipe in from the left of the pad to switch programs. This worked most of the time, although not quite as reliably as with the Yoga. The physical keyboard is suitable for productivity, with nicely sized and spaced keys and a pleasant rubberized palm rest. It's also backlit with blue LEDs.

The XPS 12 starts at $1,200 for a config similar to the Yoga 13. But Dell sent us its most fully loaded model, which costs quite a bit more at $1,700. It consists of a 1.9GHz Core i7-3517U, 8GB of DDR3/1600 RAM, and a 256GB SSD. It's a pretty similar build to our zero-point Ultrabook and the two machines traded modest wins in all of our benchmarks.

While the XPS12 is handsome and has admirable parts, it strikes us as falling shy of the mark by being too cumbersome to fully satisfy as a tablet and too pricey to fully satisfy as an Ultrabook. –KS

VERDICT 8

Dell XPS 12

$1,700, www.dell.com

BENCHMARKS

	ZERO-POINT	
Premiere Pro CS3 (sec)	840	900 (-6.7%)
Photoshop CS3 (sec)	100	
Proshow Producer (sec)	1,122	1,064
MainConcept (sec)	1,901	1,902 (-0.1%)
Quake III (fps)	358.2	345.3 (-3.6%)
Quake 4 (fps)	76.1	72.3 (-5.0%)
Battery Life (min)	250	207 (-17.2%)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our zero-point ultraportable is an Intel reference Ultrabook with a 1.8GHz Intel Core i5-3427U, 4GB of DDR3/1600 RAM, integrated graphics, a 240GB SSD, and Windows 8 64-bit.

SPECIFICATIONS

CPU	1.9GHz Core i7-3517U
GPU	Intel HD4000 integrated graphics
RAM	8GB dual-channel DDR3/1600
Display	12.5-inch 1920x1080 IPS LCD
Storage	Micron 256GB SSD
Connectivity	2x USB 3.0, Mini DisplayPort, 802.11n, Wi-Fi, Bluetooth 3.0, headphone/mic, 1.3MP webcam
Lap / Carry	3 lbs, 6.5 oz / 4 lbs, 0.6 oz

ACER ICONIA W510

A two-fer, hybrid-style



Batteries in both the keyboard base and the screen/tablet keep the W510 supplied with plenty of juice.

ACER'S ICONIA W510 also aims to give users a notebook and tablet in one, but it's what's called a hybrid device, as opposed to a convertible. This means there's a discrete tablet that contains all the brains of the operation, which can slot into a sturdy keyboard base as needed.

The Iconia W510 differs from the two convertible reviewed here in another significant way. It's running an Atom processor, specifically Intel's Z2760 system-on-chip (code-named Clover Trail). That combined with its smaller size—10.1 inches—also makes the W510 a lot less expensive. It can be purchased as a stand-alone tablet for $500, or complete with its keyboard and auxiliary battery base, like the model featured here, for $750.

Of course, what you're no doubt wondering is whether Atom sucks. Intel's ultra-low-power Atom chips got a reputation of being subpar during the rise of netbooks, which, while low-priced, were known for weak performance. The Z2760 is a 1.8GHz dual-core chip with Hyper-Threading and non-Intel PowerVR graphics. While the base clock speed is a little bit higher than previous Atom chips, the biggest change is reported to be in power consumption. It also has the benefit of running Windows 8, which was developed with mobile applications in mind, unlike the decidedly desktop-centric Windows 7.

Unfortunately, the unit Acer sent us is pre-production, so we can't test Atom's performance with benchmarks yet. What we can tell you is that the W510 booted to the Modern UI in about 16 seconds. Once there, horizontal scrolling through the interface was surprisingly smooth, but vertical scrolling, as on web pages, was inconsistent, with periodic lags. Still, we have to say we were surprised that the sucktastic qualities of old Atom were not apparent. We did experience a few quirks that we're attributing to its pre-production state, so we're going to give Acer the benefit of the doubt and assume these issues will be fixed in the final product. It's an intriguing concept, so we'd like to see it polished.

As a tablet, the Iconia W510 is far more convincing than either the Yoga 13 or the XPS 12. Freed from its keyboard, the W510 weighs just one pound, four ounces. The 10.1-inch screen is easy to hold in one or both hands, and while its 1366x768 resolution isn't going to win any contests, it's got the nice image quality of an IPS panel, under a protective layer of Gorilla Glass.

As a notebook, the experience is more compromised. For starters, the device is top-heavy, what with all the computing components stuffed into the screen, so it has a tendency to topple backward when it's sitting in your lap. Then there's the somewhat cramped keyboard, which isn't great for long bouts of typing. And its 64GB of storage is all too tablet-like for our tastes (a media reader and USB port make expansion possible). Also, its touchpad isn't great. Not only does it not support Win8 gestures, but it was noticeably less responsive than either Lenovo's or Dell's.

Still, we think this device has potential if the quirks we experienced are worked out in the final product. It's a believable tablet with far more productivity chops than other tablets offer—at least until Surface Pro arrives—at down-to-earth pricing. **–KS**

Acer Iconia W510

$750, www.acer.com

SPECIFICATIONS

CPU	1.5GHz Intel Atom Z2760 SoC
GPU	PowerVR SGX540
RAM	2GB DDR2/800
Display	10.1-inch1366x768 IPS LCD
Storage	64GB SSD
Connectivity	Micro HDMI (with dongle for VGA), Micro USB 2.0 (with dongle for full-size USB 2.0), Micro SD card reader, 802.11n, Wi-Fi, Bluetooth 4.0, headphone, mic, keyboard dock with USB 2.0
Lap / Carry (with dock)	With dock: 2 lbs, 12.4 oz / 3 lbs, 0.2 oz; tablet only: 1 lb, 4 oz

ACER T232HL

Doesn't come with a bottle of Windex

Step back, Modern UI haters, this multitouch panel won't break the bank.



WHAT MAKES A monitor "good" for Windows 8? First, you need a touch panel with a flush bezel that lets you summon the various Windows 8 command ghosts. That pretty much eliminates optical-based monitors, which have the camera lenses hidden in the corners. Microsoft also recommends no less than five-finger multitouch for the OS, but 10-finger is advisable.

That's all good news for Acer's new 23-inch T232HL touch panel. This 10-point-touch projected-capacitive panel lets you do all the Windows 8 swiping and flicking your heart desires. As you can imagine, projected capacitive carries a price premium and the Acer streets at $500—compared to, say, the $280 that a 23-inch optical touch panel might cost you. That's a big price increase, but certainly not as pricey as the InnovaTouch (reviewed next).

Running the panel through the Lagom LCD monitor obstacle course (www.lagom.nl), the Acer was good in most of the tests but we did see banding in the gradient tests. That issue wasn't in just synthetic tests, either—using a real-world product shot of a system, we could see the banding in one particular fade in the background. It's not terrible, and some might accuse us of pixel-peeping but the issue was noticeable compared with the InnovaTouch monitor. A series of digital images also looked less impressive on the Acer than the InnovaTouch—not to a great degree, but again, worth noting. The InnovaTouch also wins in responsiveness over the Acer, exhibiting less lag in response to touch commands.

Where the Acer excels is in ports—you get DVI, VGA, HDMI, and three USB 3.0 ports vs. the VGA and DVI on the InnovaTouch. The Acer is also far sexier, though we're not totally sold on the design. Neither panel is height-adjustable.

Despite all this, we think the Acer is a pretty decent panel for the price. It's IPS and, more importantly, it's a flush-bezel multitouch, which will make even the Win8 Modern UI haters reconsider their position. **–GU**

VERDICT **7**

Acer T232HL

$500, www.acer.com

INNOVATOUCH IW2235P-U

Looks aren't everything

Despite the Kim Kardashian bottom, this panel performs.



WHEN WE began our hunt for flush-bezel touch panels to review, one of the few we could find was InnovaTouch's IW2235P-U. This IPS, 10-point projective-capacitive panel isn't the typical consumer-grade monitor—in fact, it's marketed for commercial applications; its price of $754 reflects that. That the panel is slightly smaller than the Acer, at just under 22-inches viewable, might immediately make you recoil and question the difference between this panel and consumer panels that cost about two-thirds the price.

After using the InnovaTouch side-by-side with the Acer, we can say there's a difference. Using Lagom's LCD test images on the pair of 1080p panels, we found the InnovaTouch slightly better than the Acer in image quality, particularly in areas of gradation. The Acer isn't horrible, but the InnovaTouch was far smoother. Grading the panel for digital photo work, we found the InnovaTouch slightly warmer and with a bit more contrast, too. Off axis, however, the InnovaTouch had a ghastly yellowish tinge to it.

One key advantage to the panel is in touch response. We used a painting app and drew our finger across the screen. When drawing at anything other than slow speeds, the Acer's digitizer lagged far behind the InnovaTouch's.

So what's not to like? The stand, which is designed to stabilize the panel when tilted flat, is insanely overbuilt—as well as downright ugly. There's also a pretty limited input selection—no media reader, camera, or USB ports; just DVI and VGA. So we suppose your choice really depends on what you value. The edge in image quality and touch performance goes to the InnovaTouch, but the Acer aces in price, ports, and style. **–GU**

VERDICT **8**

InnovaTouch IW2235P-U

$754, www.touchsystems.com

LOGITECH WIRELESS RECHARGEABLE TOUCHPAD T650

Touch Windows 8 without a new monitor

WE WON'T LIE—Win8 isn't an optimal experience for traditional mouse and keyboard users. But what if you can't afford a touchscreen? Consider a giant touchpad. That's the idea behind Logitech's Wireless Rechargeable Touchpad T650. It's a giant (5-inch) touchpad that greatly aids the use of a touch-oriented operating system in the absence of a touchscreen.

The T650 supports up to four-finger gestures to help you navigate Metro, err, Modern. Various moves perform different commands in Win8, such as swiping four fingers to the left or right to "snap" a Window on the desktop. Four fingers up or down on the pad will minimize or maximize a window, while swiping three fingers up pulls up the Start screen. We're honestly not fans of any of the multitouch touchpad controls, as they're not uniform across devices and all the swiping and gesturing makes us feel like we're casting a magic missile more than controlling a cursor. Plus there's the tendency to inadvertently open a program.

The Touchpad's surface itself is glass and, frankly, smoother than the two touch panels we reviewed here. It recharges via Micro USB and works with Logitech's wonderful Unify system so you can run six Logitech Unify devices from a single 2.4GHz RF dongle. Using the Touchpad feels luxurious if you're coming off a cramped notebook touchpad but it can use some improvements. The Touchpad has a hard edge that we wished was beveled, as we kept catching our finger when we swiped in from the right to pull up the Charms bar.

While it's great for moving through the Modern interface quickly, we had problems with the Touchpad in precision work, such as selecting a word or one or two letters of a document for deletion or editing. With a mouse, it's second-nature to make such precision moves—not so with the Touchpad, which takes too much concentration. Another issue we had was selecting things to drag around the desktop with the Touchpad—it takes a wee bit too much finger pressure to accomplish. –GU

The T650 offers a luxuriously smooth, 5-inch touch surface to navigate Windows 8.



VERDICT 8

Logitech Wireless Rechargeable Touchpad T650

$80, www.logitech.com

LOGITECH T620

Years later, we still have issues with touch mice

LOGITECH'S T620 reminds us of other touch-enabled mice and—unfortunately—those aren't mice we were very fond of. Most of the surface of the T620 is touch-enabled. To left-click you can either push the whole body down or tap the left side of it. That's not it, though—no fewer than 10 different Windows 8 functions can be accessed by touching or stroking different parts of the mouse body. To pull up the Charms bar, for example, you can stroke your finger in from the right side. In theory, it sounds neat to be able to command the OS from the mouse but we found the surface much too cramped. If we had to have "touch," we'd rather pair Logitech's Touchpad T650 with a traditional mouse rather than just try to tough it out with the T620 alone. –GU

The Touch mouse T620 tries to jam too many features into its small touch surface.



VERDICT 6

Logitech T620

$70, www.logitech.com

LOGITECH T400

It's like the Start Menu never left

YOU DON'T KNOW how much something means to you until it's gone, and with Windows 8, we're really pining for the Start menu. Sniff. Logitech's T400 helps us get over that loss. With one touch on the glass touch area, the Modern UI Start screen is available. Like the T620 and T650, it uses Logitech's rather nifty Unify dongle that can drive up to six devices at once. Beside the easy access to the Start screen, you can also smoothly scroll on two different axes with the T400. We appreciate the limited command set rather than the surfeit of gestures on the T620. The only other thing we'd want is an option to directly access the Charms bar. Our one real complaint about the T400 is that it's way too small, which made driving the mouse uncomfortable rather quickly. –GU

We liked the well-defined touch area of the T400 but it's built for smaller hands.



VERDICT 7

Logitech T400

$50, www.logitech.com

MICROSOFT SCULPT COMFORT KEYBOARD

Curved Microsoft keyboard offers hotkeys for Windows 8

THE NEXT iteration in a long line of curved keyboards from Microsoft, the Sculpt Comfort Keyboard shares familiar lines with its predecessors. As ergonomic keyboards go, this one is rather flat, and the keys are contiguous from side to side. The palm rest is removable and also has feet enabling you to add height to the front of the keyboard.

Designed for use with Windows 8, the Sculpt Comfort Keyboard's function keys double as hotkeys used to emulate actions and gestures within Microsoft's new OS. The hotkey configuration is controlled using a switch above the number pad, making it difficult to switch back and forth between the two modes.

Microsoft's Sculpt Comfort Keyboard uses 2.4GHz wireless connectivity with the included USB dongle and is powered by two AAA batteries. –TF



Microsoft's latest curved keyboard features a split spacebar and wireless connectivity.

VERDICT **8**

Microsoft Sculpt Comfort Keyboard

$60, www.microsoft.com

MICROSOFT WEDGE MOBILE KEYBOARD

Bluetooth keyboard geared toward mobile PC or tablet users

MICROSOFT'S WEDGE Mobile Keyboard provides an alternative input method for PC users on the go. A sturdy design paired with its diminutive size make it easy to carry in a bag or backpack. The included cover and tablet stand add significant weight to the keyboard. Bluetooth connectivity allows the Wedge Mobile Keyboard to be used with tablets or smartphones running a variety of platforms.

Provided along the top row of the keyboard are media playback controls and buttons to activate the Charms buttons found in Windows 8. The Wedge Mobile Keyboard's physical keys make touch typing much more feasible than screen-based input methods, but the key spacing leaves something to be desired.

The build quality of the Wedge Mobile Keyboard is second to none. We wish the same could be said about the typing experience. –TF



Mobile Keyboard really comes into its own when used with Windows 8.

VERDICT **7**

Microsoft Wedge Mobile Keyboard

$80, www.microsoft.com

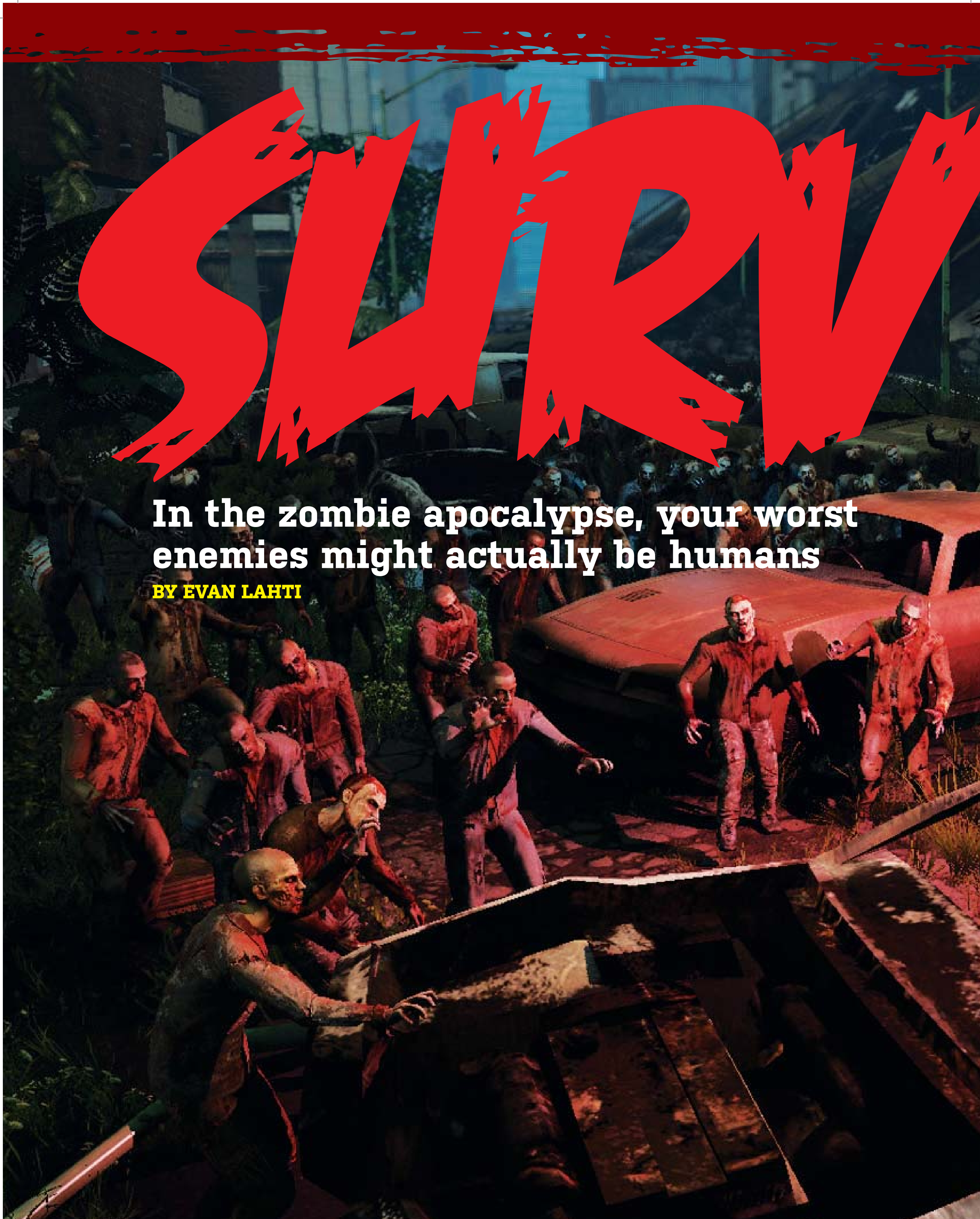
GETTING BY WITHOUT TOUCH

HOW TO NAVIGATE WINDOWS 8 WITH KEYBOARD SHORTCUTS

So you want to update to Windows 8 but have no intention of buying new touchy-feely hardware. Some common keyboard shortcuts will make getting around Windows 8 much easier than using just your mouse.

Windows key + start typing: Search
Windows key + C: Expose the Charms bar
Windows key + F: Open the Search charm to search files
Windows key + Q: Open the Search charm to search apps
Windows key + H: Open the Share charm
Windows key + I: Open the Settings charm (this is where you'll find the power button)
Windows key + K: Open the Devices charm
Windows key + Shift + period (.): Snap an app to the left
Windows key + period (.): Snap an app to the right
Windows key + J: Switch the main app and the snapped app
Windows key + Ctrl + Tab: Cycle through open apps (except desktop apps)
Windows key + D: Switch from Modern to Desktop mode
Windows key + X: Access a slew of Windows tools like Power Options, Device Manager, Control Panel, Run, etc.





SURV

In the zombie apocalypse, your worst enemies might actually be humans

BY EVAN LAHTI



THE RULES used to be simple: Don't get bitten; destroy the brain. Zombie games like Left 4 Dead, Killing Floor, and Resident Evil shared a vaguely similar approach, even as they offered terrific takes on one of horror's most ubiquitous subgenres.

But zombie games are maturing. They're mutating beyond simply being zombie-themed shooters, and redefining what we know as the zombie FPS into more of a genuine survival game. You still have to get headshots and avoid getting gnawed, but there are new threats to manage. Thirst. Hunger. Darkness. Scarce resources. Untrustworthy strangers.

A gun can't solve every problem you have in DayZ, The War Z, and No More Room In Hell, in other words. These upcoming zombie games demand different skills: communication, leadership, a knack for navigation over open terrain, nerves of steel, and even a little deception will help you survive. In short, they're the zombie games we've dreamed of: demanding and realistic survival simulations that ask a lot of you, but reward players with unforgettable, self-authored stories of sacrifice, horror, and survival. While all three titles are still works in progress, they're playable in their nascent state. But before you enter these respective worlds of zombie hordes, read this story so you're fully prepared for the horror that's in store.

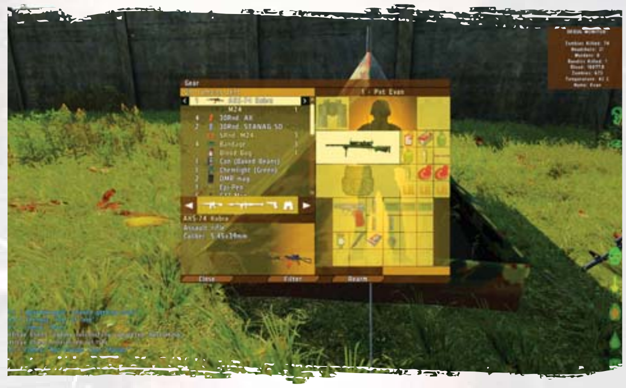


Everything you learned about surviving the zombiepocalypse was wrong

IN APRIL 2012, an unfinished mod developed by a former New Zealand military officer was quietly released. The add-on was designed for Arma 2, a niche military simulation game from Czech studio Bohemia Interactive, best known as the creator of Operation Flashpoint.

Initially, DayZ arrived with little fanfare. "I developed it, essentially, in secret and that removes a lot of ego; it removes a lot of promises," creator Dean Hall told us in May. But DayZ would catch PC gaming by complete surprise. In just four months, it had drawn 1 million unique players. Hundreds of 50-player custom servers hosting the still-incomplete, alpha version of the mod sprung up in a matter of weeks. Almost 200,000 people were playing every day at the peak of the mod's popularity in August. The zombie game that gamers had openly fantasized about on message boards—an open-world, do-anything, go-anywhere survival game—had appeared out of thin air, albeit in a rough and half-realized form.

We now consider DayZ the progenitor of the modern swarm of realistic zombie games. Its average daily population has since dwindled to a still-substantial 50,000 in October, but this lull is actually just downtime preceding a larger release: Its spark of success has spun off a full-time, in-house development team at Bohemia led by the mod's creator, Dean "Rocket" Hall. This team labors away on a stand-alone version of DayZ—a more complete, fuller-featured version of the mod.



Loot is everything in DayZ. Your carrying capacity depends on the size of your backpack—a rare ruck can become a literal target on your back. DayZ's rigid and unintuitive inventory interface, unfortunately, is a well-documented shortcoming.

A particular asset is Arma 2's ballistics modeling, which distinguishes it from the vast majority of shooters in gaming. Bullets travel parabolically in Arma 2 and DayZ based on their caliber, so the behavior of a hunting rifle, revolver, and M4A1 carbine, for example, all differ significantly. Getting a knack for your weapon is as important as just finding one—someone who knows the nuances of a low-end gun like a Lee Enfield (a bolt-action WWI rifle) is arguably more dangerous than someone holding an AS50 anti-material sniper rifle but doesn't know how to zero it in. Guns emit different amounts of noise, too—snipers usually find it safest to operate in teams for protection, as a single shot can ring a dinner bell for zombies two or three hundred meters away. For this reason, silenced side arms and rifles are some of the most prized items in the game.

To get your hands on high-end equipment, you need to scour the game world. You don't complete quests or levels or experience points in DayZ, so typically you're just worried about gathering useful gear—tools, food, and weapons—with-



We now consider DayZ the progenitor of the modern swarm of realistic zombie games.

Even with placeholder animations, annoying bugs, and incomplete features, DayZ has a death-grip on gamers' attention. Relative to the zombie games that preceded it, it offers unprecedented freedom and makes other facets of the apocalypse—including fellow survivors—as much of a threat as the undead. Its style of zombie realism arose partly from the inspiration of its creator. Hall had originally pitched the mod as a zombie-less training simulator, having endured survival training himself during an exchange program with the Singaporean military.

A lot of DayZ's appeal is owed to Arma 2, whose Real Virtuality engine forms a foundation for its authenticity. Arma 2's creators went to great lengths to create high-fidelity game technology, and DayZ benefits from sharing systems that model for vehicle fuel consumption and modular vehicle damage, a real-time night/day cycle, a working compass and detailed topographical map, voice chat that's affected by proximity, and an engine that can render objects over long distances.



Chernogorsk (aka "Cherno") is DayZ's largest death trap. Erm, city.

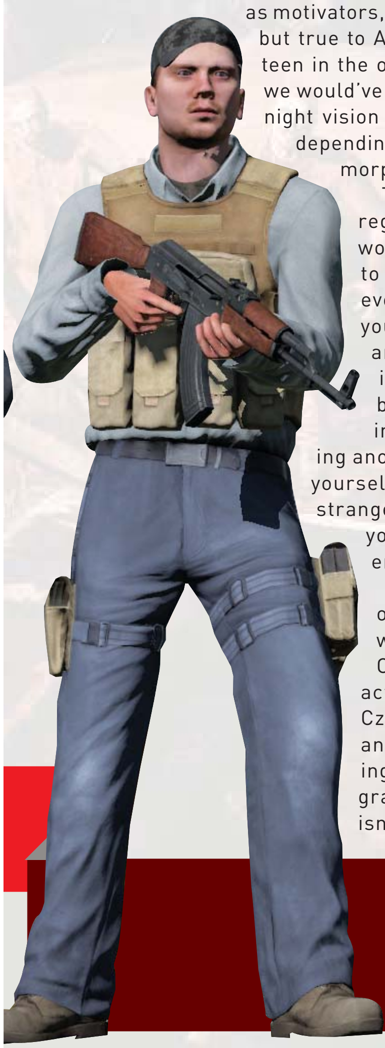


Surveillance is one of the pleasures of DayZ. It's a game that makes looking and listening a genuine skill. Scouting an area for dangerous players (which you'll need binoculars or a rangefinder for) is a good habit.



DayZ's Chernarus map is actually one of several playable worlds available for DayZ. Modders have ported other player-made Arma 2 maps into the mod, including the tundra of Namalsk, the jungle of Lingor Island, and a dense urban desert called Fallujah.

in the game's enormous sandbox. One of DayZ's masterstrokes is that the quest for gear always feels self-motivated; your needs and emotions naturally drive your goals. When you enter DayZ for the first time, you're unarmed. You instinctively want to find a gun, but to do it you need to put yourself in danger: Weapons and items only spawn inside structures, and zombies lurk where structures dwell. Other survival mechanics operate as motivators, too. You need to eat. You need to drink, but true to Arma's fidelity, you can't fill your canteen in the ocean. We've been in situations where we would've traded grenades for a can of pasta, or night vision goggles for a soda. If you're injured, depending on your ailment, you'll need to find morphine, painkillers, or antibiotics.



This isn't a game where your health regenerates automatically, in other words. Actually, the quickest way to restore your health in DayZ isn't even something that can be done by yourself. Eating food slowly restores any blood you've lost from injury, but in order to use a blood transfusion bag, you need another player—meaning friendship (or temporarily trusting another player, at least) is key to healing yourself. The trouble is that interacting with strangers in DayZ—other players that, like you, want to find better gear—is inherently dangerous.

These intricate mechanics play out in one of gaming's most detailed worlds. DayZ borrows Arma 2's map, Chernarus, a 225km² country that's actually a satellite-model slice of the Czech Republic (see comparison photos and maps here: bit.ly/realdayz). Basing Chernarus on real topographic data grants it a feeling of authenticity that isn't present in other virtual environments. Hills roll into unexpected ponds and forest valleys. Road signs are printed in Cyrillic. Power lines run perpendicular to ruined castles. Villages and dense cities cling to the coast. The only downside is Chernarus's realistic scale: To get where you want to go, you might have to run three or four kilometers in real time.

It's worth noting that modders—the ever-busy carpenter gnomes of PC gaming—have ported several Arma 2 custom maps into the mod. A current favorite is Namalsk, an island connected by a half-kilometer railway bridge. You can spy it and the other four currently available landscapes at www.dayzdb.com. A third-party mod manager utility and server browser, DayZ Commander (www.dayzcommander.com), is a frustration-free way to download these add-ons and get DayZ running on either a retail or digital version of Arma 2.

Bohemia is expected to release DayZ's stand-alone version by the end of 2012. Planned features include added bits of fidelity like gear degradation, refined melee combat, and improved zombie AI. Most importantly, Bohemia emphasizes, going stand-alone will help them address the hacking that's plagued the mod version of DayZ.

Current issues aside, DayZ's biggest innovation is the trust it places in players to find their own fun. Compared to conventional shooters, it's barren of any cinematic content. But DayZ leverages complex systems and difficulty in a way that produces incredible stories and interactions that don't exist in other games. Banal tasks like watching another survivor through binoculars and trying to determine where they're going or if they're friendly are meaningful safety measures. YouTube is full of funny, scary, and fascinating interactions between strangers and survivor groups, bandits and self-described axe murderers, do-gooders and kidnappers. A community-sanctioned tournament series, the Survivor Gamez (www.survivorgamez.com), sprung up over the summer. For the patient player, the search for water in DayZ can be just as heart-pumping as a shootout. It's the first zombie game to emphasize stories over shooting, and the first that makes human nature an implicit part of everything you do.

This isn't a game where your health regenerates automatically.

WarZ

A sincere form of flattery made easier to install

IN JULY, FASTER than you could hoard canned goods, a DayZ imitator emerged. Within a month of DayZ's flash of popularity, a new studio told the gaming world that it was hard at work on its own player-versus-player and player-versus-zombie, open-world survival sandbox. And unbelievably, Hammerpoint Interactive said its new project would be available before the end of 2012.

The announcement of The War Z was met with skepticism and cynicism flecked with curiosity. Its features were uncomfortably familiar: a huge, verdant open world dotted with mundane and military loot, a first-person and third-person camera, and dedicated servers, all laid out to support unscripted, persistent gameplay between zombies and other players. Even the look of its characters—baseball cap-wearing, backpacked survivors—resembled DayZ's. The War Z wasn't being subtle about its inspiration.



Using separate real-money and in-game currencies, The War Z allows players to purchase some basic items—like melee weapons and food—before they spawn into the game. If you die, anything you're carrying is dropped.

But if this blatant borrowing of ideas resulted in a good game, would it matter? More details snuck out as the press got early access. The War Z would include a player-written questing system, appearance customization, the ability to place bounties on other players' heads, an RPG-style skill system, and a micro-transaction store for items. Perhaps most interesting was The War Z's promise to offer something called Strongholds—small, private instances like a cabin in the woods, a farm, a small town on a cliffside, or a train yard that clans or individual players can rent for money. Even if these features don't appeal to you personally, they painted a picture of a game that was less of a clone than originally thought.

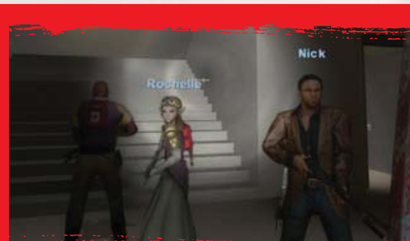
"In fact, we're fans of the mod," The War Z executive producer Sergey Titov said to VG247.com when asked about DayZ in October. "Ultimately, we hope gamers end up playing both The War Z and the DayZ stand-alone. It's difficult to compare at the moment, but although there are similarities, we tried creating a game that was a little bit easier to access and play, and that would allow players to be creative and create their own scenarios."

There's some consensus that this isn't a "there's only room for one of us in this town" situation, but rather a sign that this subgenre is simply in the process of losing that prefix. Competition between companies usually benefits consumers, and The War Z will have a lot to live up to. Being built atop a military simulator, DayZ carries a lot of inherent traits that lend itself to survival simulation, and not all of them are easily reproducible. But the other side of that coin is that The War Z isn't burdened by some of DayZ's inherent quirks, and seems to benefit from being coded from scratch. It's offering a few simple antidotes to some of DayZ's issues, like confusing inventory management, complicated weapon handling, and rigid animations.

It's also favoring accessibility more than DayZ. The War Z does have permadeath—if you die, you lose that character and their items forever—but only if you're playing with a Hardcore mode character. Normal mode simply temporarily locks your ability to play that character for 24 hours and removes any items they were carrying. Likewise, you can get a leg up on a new character by spending in-game currency that persists

FIVE INCREDIBLE LEFT 4 DEAD 2 CUSTOM CAMPAIGNS

L4D2 MAY LACK REALISM, BUT IT'S STILL THE BEST ZOMBIE-THEMED ACTION GAME AVAILABLE. THE MODDING COMMUNITY HAS CREATED HUNDREDS OF FANTASTIC CUSTOM CAMPAIGNS THAT ARE A CINCH TO INSTALL



Questionable Ethics

Fight your way through a white-walled, underground, secret research facility filled with traps (like a ceiling that drops cars on you) and endless tricks. Almost Portal-like in its devious cleverness, Questionable Ethics is the work of a Korean modder. Play the sequel after you're done. bit.ly/questionpcg



Helm's Deep Reborn

The Lord of the Rings: The Two Towers' iconic castle siege is reproduced here with almost 1:1 authenticity, with the exception of L4D's menagerie of uglies swapped in for Uruk-hai. This multistage survival map has you meat-grinding through hundreds of zombies, climaxing in a defense of—and then escape from—the throne room. Nonstop violence and calamity. bit.ly/l4dhelms



A stamina mechanic is one of the small-but-significant differences separating The War Z from DayZ. You can't run forever, but the undead can—sprinting into a town while out of breath might be all it takes to doom you.



Nighttime in The War Z is inherently dangerous. Flares, chemlights, and flashlights will help you find your way around, but any light sources will inevitably draw attention from other players.

across all characters, so it's easier to recover from a death.

The focus on accessibility extends to gameplay itself, where weapon behavior is more akin to games like Battlefield 3. An assault rifle or a pistol handles with the lightness and responsiveness you'd expect in an ordinary multiplayer FPS. You'll still have to keep noise in mind when firing—letting loose with a sniper rifle will make you awfully popular in your part of the map. There are also small but significant differences between DayZ and The War Z in player movement. You can crouch and go prone in both games, but The War Z has a jump button. More realistically, you can't sprint infinitely in The War Z—running depletes a stamina meter that recharges over time, so you'll want to conserve your sprinting until you really need it.

The War Z also features a few imaginative zombie types. "Sleeper" zombies deceptively lie dormant on the ground, but rise if they notice you nearby. The developers have also promised a rare "stem cell–carrying" zombie that only appears at night. "Visually, they'll look very different from other infected; they're much more aggressive, fast, and agile. They're rare, they hunt only at night, so the best place to find them will be larger cities at nighttime," says Titov. Killing one of these super-zombies will yield stem cells, which are kind of a special currency within The War Z that can also be used to create a vaccine. Hammerpoint hopes that the relative difficulty of bagging one of these zombies will inspire some creative teamwork and competition among players.

These corpses lurk in a world about 160km² in size—about 70 percent the size of Chernarus in DayZ. Encouragingly, Hammerpoint has said that anyone who buys The War Z (available now for pre-order at $25) will receive additional maps that are released. The game's stock map is inspired by Colorado, a rocky wilderness pocked with outposts, lakes, and small towns.

With The War Z, the worry is that the hurry to release ahead of its competition will leave the game's anti-cheat features, netcode, or other fundamental systems incomplete. For now, we're encouraged by the fact that, despite The War Z's focus on accessibility, the initial alpha version of the game still reproduces some of the feelings of self-preservation, carefulness, and spontaneous danger that arise in DayZ. It's a game, in other words, where death can come unexpectedly and at any moment. Idling in front of a windowsill for too long while scouring an office building for supplies can be all it takes to doom you, but (if you're playing on Normal mode), when the Grim Reaper strikes, it isn't quite as painful or permanent. Most exciting is The War Z's system for formalizing player interactions with a player-authored quest system—you'll be able to hire other players to complete tasks. This system hasn't been shown yet, but should be available by the time you read this, after the game transitions into open beta.



GoldenEye 4 Dead

An amalgamation of settings drawn from the 1995 Bond film, including a dam, runway, and a hidden space base in Aztec ruins, G4D is more than a pile of references: It's a genuinely taxing and creatively designed campaign, and one that takes clever liberties with its source material. Be on the lookout for Easter eggs. bit.ly/l4dgold



Let's Build A Rocket

Instead of a sprawling campaign that has you racing to the safe room as a finish line, Let's Build A Rocket gathers the survivors around a small launch pad and hangar. Using a computer panel, you research new technology to unlock L4D2's weapons as zombies harass, juggling these tasks as you and teammates slowly construct a rocket to escape Earth. bit.ly/l4drocket



Suicide Blitz 2

A great example of the indulgent set pieces, Suicide Blitz 2 pushes the survivors through a bowling alley, maximum security prison, and finally to the 50-yard line of a football stadium for a titular stand-off against hulking zombie Tanks in football jerseys. bit.ly/l4dblitz

No More Room in Hell

Expect at least half of your team to die

UNLIKE THE WAR Z AND DAYZ, No More Room In Hell doesn't fit into the newly born "outdoor survival game" category. It's fairer to call it an advanced, hardcore take on conventional co-operative zombie games like Left 4 Dead. In development for a decade before releasing last year, the Source engine mod was recently selected through Steam Greenlight to release as a full, free game on Steam, but you can play it now by downloading it from www.nomoreroominhell.com.

What NMRiH shares in common with DayZ (other than an awkward name) is the unapologetic way it throws you into a brutal post-apocalyptic scenario with almost no instruction. You're fragile. Bullets are scarce. And zombies will infinitely spawn until you complete the map's tough (and partially randomized) objectives, like switching on generators or finding the keycode that unlocks a door. NMRiH's unforgiving approach to zombie co-op practically guarantees that a few of your teammates will need to die as you trudge from your spawn area to the end of the level. Your eight-person survivor group is twice the size of Left 4 Dead's, and a given round typically sees your team whittled down as players inevitably get separated, surrounded, and eaten.



Though it resembles Left 4 Dead, what No More Room In Hell shares in common with DayZ and The War Z is that it often makes fleeing from and avoiding the undead preferable to fighting them.

Most of NMRiH's zombies are of the slow, vintage variety. They're easy to evade, but much more durable in combat, so the danger arises from their numbers and players' modest agility. You can only sprint for a brief period of time, so wandering into a cluttered garage with a single exit, for example, is sometimes all it takes to doom you. A handful of speedier zombies jog after survivors (some of which—harrowingly—are children), but NMRiH otherwise lacks any undead with special abilities like leaping, acid-spitting, or tongue-lassoing. This gives the game a more grounded feeling; the molasses-speed creep of the horde gives you room to react, but the absence of a revival mechanic and the relative weakness of weapons has a way of turning small mistakes into permanent death.

Also refreshing is NMRiH's emphasis on immersion. Like DayZ, the volume of voice communication is based on distance, meaning a far-off teammate's cries for help may go completely unnoticed. The game also doesn't place any interface, crosshairs, or HUD on the screen by default, and all of its maps are pocked with corners that are absolutely saturated with opaque, impermeable darkness. A small antidote to this is the flashlight. It mercifully doesn't require fresh batteries, but just as you'd expect in real life, you can't hold it and swing a sledgehammer or operate an M16 simultaneously. This design makes the seemingly banal role of "flashlight holder" a vital role for guiding teams through unlit corridors—being the guy responsible for shining the light on enemies while your teammates whack away with shovels or chainsaws is genuinely helpful.

The melee weapons themselves take a lot of finesse to operate. Most of them swing slowly (and with a wind-up animation much lengthier than Left 4 Dead's), meaning they're nowhere near the weed wackers you wield in Valve's co-op zombie game. And despite their decomposing state, the un-

THE FIVE MOST IMPORTANT ZOMBIE GAMES

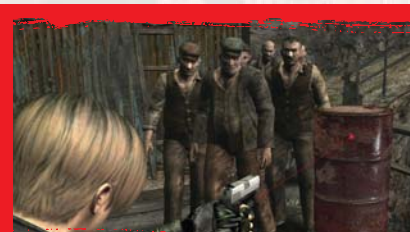
OVER THREE DECADES, THESE TITLES HAVE SHAPED (OR WILL SHAPE) THE ZOMBIE GENRE AS WE KNOW IT



Zombie Zombie

1984 (on ZX Spectrum), Spaceman Ltd.

One of the first games to feature zombies as its subject. Zombie Zombie had a very indirect way of dealing with the undead: You had to lure zombies up to tall buildings and then trick them into falling off to their doom. Coincidentally, it was one of the first games to use two-channel sound.



Resident Evil 4

2007 (on PC), Capcom

The RE4 PC port was particularly bad, but the game still stands as the best "actionization" of the zombie genre. Japanese difficulty, boss design, and pacing tempered by Western playability and an over-the-shoulder camera spawned hordes of imitators. Weapon customization lent meaningful progression to the dozens of brushes with undead creatures.



Zombies spawn endlessly in No More Room In Hell; this isn't a game that's afraid to overwhelm you with enemies. Some maps stack dozens of zombies directly outside the spawn room, only giving you a handful of bullets and melee weapons to deal with them.



"Behind you!" The snail-speed crawl of zombies in NMRiH makes room for communication and decision-making in a way that isn't present in most zombie-themed shooters.

dead are durable, taking multiple hits to bring down unless you skillfully connect with their skull. A typical hand-to-hand fight is a tense tango of bobbing and weaving, angling to position yourself to just the right distance where your axe or machete can clobber a zombie but the zombie can't hit you. This limited room for error makes individual zombie kills feel like a heroic effort.

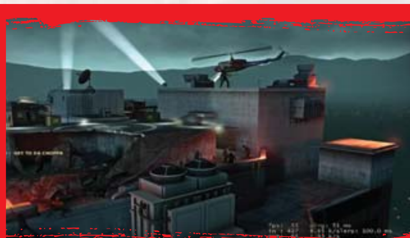
Firearms are also handled with a modicum more realism than in Left 4 Dead. They're scarce, and pistols don't have infinite ammo—when you pick one up, it might have a meager six or seven shots waiting for you in the magazine. Moreover, they're tough to aim: Shots that look like a sure thing through ironsights won't always produce a kill. And like DayZ, most guns have a discrete ammunition type—you might find handgun ammo, but if it's .45 ACP and the only pistol you have is the 9mm Beretta M9, it's not going to help you.

Appropriately enough, a lot of NMRiH's scares arise from the lack of room in its levels. Structurally, they resemble Left 4 Dead's meandering, point-to-point sprints, but aggressive collision detection between zombies and even other teammates means that it only takes a few zombies to block a doorway.

Our favorite level is called Cabin and begins with a leap of faith. You spawn in a secure attic, and begin by combing dark corners for melee weapons, flashlights, and whatever you can find. But to start the level, you have to drop straight through a hole in the ceiling—a one-way trip that usually makes the first survivor in instantly popular with zombies. Our tactic is to have this leading player lure zombies away from the entrance so the rest of the team can safely descend. The lead usually gets beat up in the process, but it's preferable to throwing everyone into a crowded, panicked melee.

A final twist on all this layered brutality is NMRiH's infection mechanic. Zombies will occasionally grapple you, and if you or a teammate is unable to shake them loose, you'll get bitten. You know what happens next: Within minutes, you'll drop dead, and rise again as an AI-controlled zombie. It's surprising that the mod is the only zombie game we know of to model this classic horror trope.

As the mod prepares for a full release on Steam, the development team slaves away on new features including National Guardsmen NPCs that will help or hinder you, additional game modes and playable characters, throwable weapons, and a full dismemberment system. But even now, NMRiH is a stand-out take on zombie survival, and the scariest multiplayer game we've ever played. Unlike in Left 4 Dead, trying to kill every zombie you meet is the surest way to have your human card revoked.



Left 4 Dead

2008, Valve

The reigning champ in zombie co-op, L4D's mildly forking level design and "zombie director AI" combined to create movie-like campaigns that wickedly and dynamically threw threats at your survivor group as you progressed through each chapter. Another L4D innovation, asymmetrical multiplayer, has been copied in games such as Dead Space 2.



The Walking Dead

2012, Telltale Games

Telltale's adventure spin-off of the Robert Kirkman comic book series has taken a novel-like, "Choose Your Own Apocalypse" approach to the genre. Though it's modest on interaction, choices you make—from whom to rescue to which friend should get a candy bar—affect the content of future episodes. The five-episode series has already been renewed for a sequel.



Dead State

2013, DoubleBear Productions

Zombie shooters have been done to death; Dead State is a turn-based RPG. Described as Fallout-meets-The Walking Dead, it's being helmed by Vampire: The Masquerade writer/designer Brian Mitsoda. You play as the leader of a group of survivors that've holed up in a Texas elementary school. The game earned $332,635 on Kickstarter in July.

SURVIVAL GEAR

SIX PRODUCTS THAT WILL SAVE YOUR ASS IN THE ZOMBIEPOCALYPSE





EOTECH XPS2 ZOMBIE STOPPER

You don't have time to squint down iron sites when Zed has overrun your position; Eotech's XPS2 holographic weapon sight lets you easily execute zombie headshots up close and far away. Did we mention it has a biohazard reticle, too?
$560, www.eotech-inc.com



SUREFIRE X400

To make a zombie kill at night, you'll need to see the enemy. You can easily do that with Surefire's compact and light X400 weaponlight. It offers 170 lumens of visibility and an integrated 5mW laser.
$595, www.surefire.com



BLACKHAWK PHOENIX PATROL PACK

The Blackhawk Phoenix Patrol Pack is a dead ringer for the Coyote Patrol Pack you spawn with in DayZ. It's not so fancy that you'll get sniped by someone "shopping" for a new ruck, but it's big enough to carry all the essentials of a bug-out bag.
$180, www.blackhawk.com



CMMG TACTICAL BACON

As you shiver in a cold, abandoned building while zombie hordes shamble around outside, nothing will remind you of civilization more than a few slabs of greasy bacon. Each can of Tactical Bacon contains 18 servings of damned-tasty rashers.
$20, www.thinkgeek.com



BONE MACHETE 2012

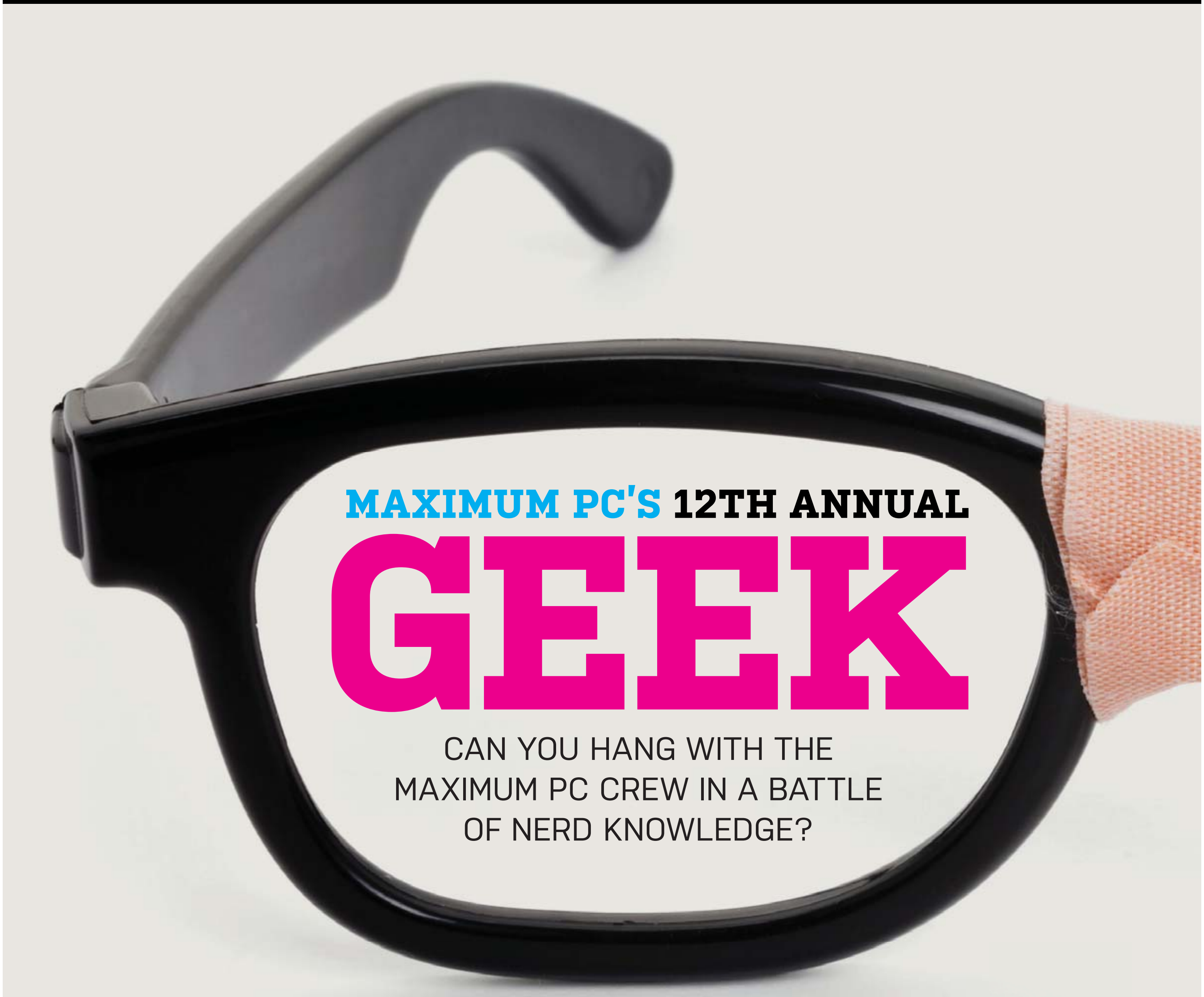
This is no damned shopping-mall blade. Zombie Tool's Bone Machete 2012 has enough cleaving power to lop off all the zombie arms and undead heads you need to when your primary weapon goes dry.
$290, www.zombietools.net



BATTLEMUG

If you just made the zombie kill of the week, the only way to celebrate is to heft a nice cold one. To do that in style, you need the Battle Mug. Made of solid aluminum, the Battle Mug can even be used to store your unused rail accessories.
$190, www.battlemug.com



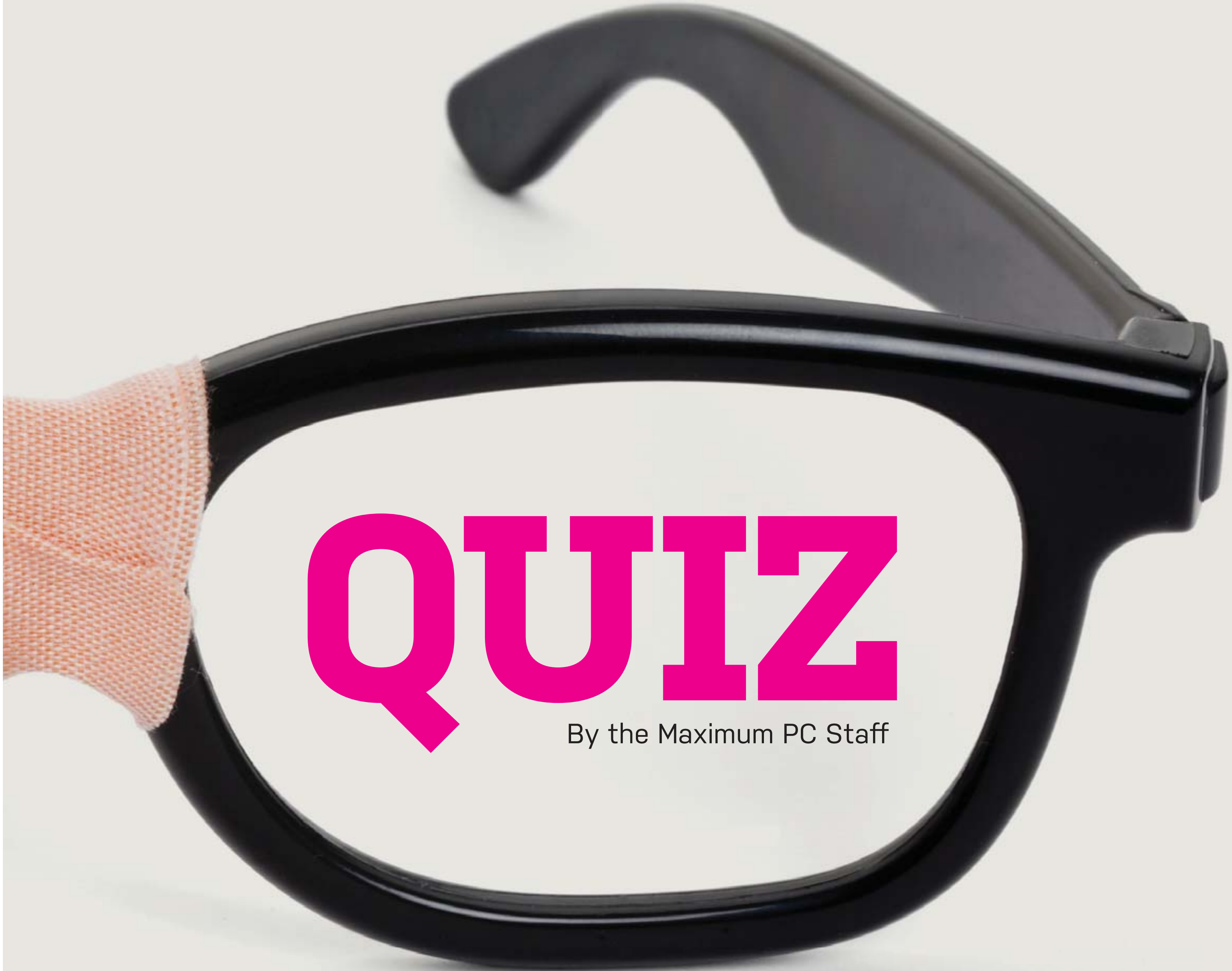


MAXIMUM PC'S 12TH ANNUAL

GEEK

CAN YOU HANG WITH THE MAXIMUM PC CREW IN A BATTLE OF NERD KNOWLEDGE?

Since time began, the fittest of any species have found ways to test their mettle in the fiery cauldron of competition. First there was the Olympics, then Jeopardy, and finally—the Maximum PC Geek quiz. Though you are probably feeling confident reading this and are mentally cracking your knuckles, keep in mind that we've designed this quiz not to entertain you but to destroy you. Yes, those are fighting words. And yes, we mean it. Don't worry—we've made this a fair fight by mixing softballs with knees-to-the-groin-region, so if you're a regular reader of this magazine and don't go running off to your Google mommy, you should come out



QUIZ

By the Maximum PC Staff

the other end of this a better man, woman, or child. We've put together a ball-busting 45 questions on every geeky topic imaginable, and added three bonus questions relating to famous quotes, to give your brain a breather.

Once you're finished you can read our handy scoring companion to see how you rank, from troglodyte to neckbeard, and to find your place in society. Regardless of the outcome, know that you are one of us, and your quirky brand of geek wisdom is something we celebrate. So welcome home, gentle reader, and good luck on the quiz—you're going to need it.

1. Which feature is not a requirement for Intel's "Ultrabook" designation?
A. Ivy Bridge processor
B. 18–21mm height, depending on screen size
C. Five-hour battery life
D. Intel Anti-Theft technology

2. The technology whereby an SSD reserves a portion of its capacity for file swapping is known as:
A. Trimming
B. Capacity Buffering
C. Over Provisioning
D. Zone Referencing

3. What's the English translation of the Klingon phrase Tah Pagh TaHbe'?
A. Let them eat cake
B. Practice makes perfect
C. To be or not to be
D. Today's a good day to die

4. Intel's upcoming Haswell processor will fit into which CPU socket?
A. LGA 1155
B. LGA 1156
C. LGA 2011
D. LGA 1150

5. In the Windows command line, what command would you type to navigate to a subfolder called "videos"?
A. cd videos
B. goto videos
C. dir videos
D. changedir videos

6. What is the next-gen Wi-Fi standard after 802.11n?
A. 802.11ac
B. 802.11dc
C. 802.11bc
D. 802.11nxt

7. Which RAID variant combines both striping and mirroring of data?
A. RAID 1
B. RAID 5
C. RAID 0
D. RAID 10

8. Which of the following is not an Nvidia product line?
A. GeForce
B. Tegra
C. Quattro
D. Tesla

9. Which x86 chip was the first to handle 32-bit data sets?
A. 80386DX
B. 80376
C. 80960
D. 80386SX

10. The person in this photo is wearing which augmented-reality project on her face?
A. Apple eyePad
B. Google Glass
C. Microsoft Vision
D. Asus Zenset



ANSWERS: 1-A, 2-C, 3-C, 4-D, 5-A, 6-A, 7-D, 8-C, 9-A, 10-B

11. **The SSD pictured here uses a controller made by which company?**

A. Marvel
B. Intel
C. OCZ
D. SandForce



12. **What manufacturing process did Intel's Prescott chips use?**
A. 120nm
B. 80nm
C. 90nm
D. 45nm

13. **What is the clock speed of PC10600 RAM?**
A. 1,600MHz
B. 1,666MHz
C. 1,333MHz
D. 1,866MHz

14. **Which Android release is the oldest?**
A. Jelly Bean
B. Froyo
C. Donut
D. Gingerbread

15. **Which of the following is not a Unix distribution?**
A. Ubuntu
B. Red Hat
C. Debian
D. Amoeba

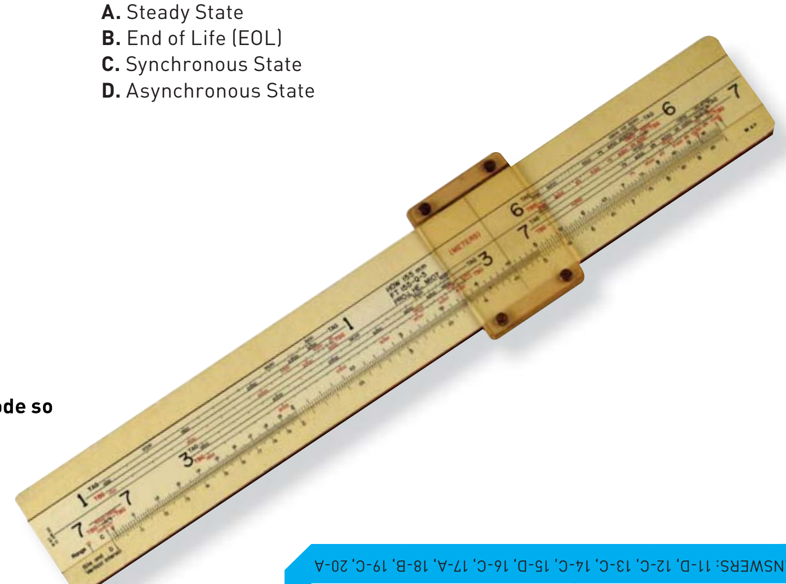
16. **What year was Windows 7 released?**
A. 2007
B. 2008
C. 2009
D. 2010

17. **Which famous geek tweaked his school's program code so he would be placed in class with mostly female students?**
A. Bill Gates
B. Larry Page
C. Steve Wozniak
D. Mark Zuckerberg

18. **In a water-cooling loop, you always want the reservoir to be located:**
A. Below the highest block
B. Above the highest block
C. In line with the highest block
D. Anywhere except inside the chassis

19. **The technology named FXAA and used by Nvidia GPUs stands for what?**
A. Full SXene Antialiasing
B. Full Extension Antialiasing
C. Fast Approximate Antialiasing
D. Fast Axion Antialiasing

20. **After an SSD has been in use for a while, its performance declines and it enters a state termed:**
A. Steady State
B. End of Life (EOL)
C. Synchronous State
D. Asynchronous State



ANSWERS: 11-D, 12-C, 13-C, 14-C, 15-D, 16-C, 17-A, 18-B, 19-C, 20-A

21. **Polishing the base of your CPU cooler to improve contact is known as what?**
A. Detailing
B. Buffing
C. Fringing
D. Lapping

22. **At launch, the Windows 8 app store had approximately how many apps worldwide?**
A. 50,000
B. 5,000
C. 10,000
D. 25,000

23. **Which of the following devices is not powered by Nvidia's Tegra 3 processor?**
A. Google Nexus 7
B. Microsoft Surface RT
C. LG Nexus 4
D. Tesla Model S

24. **What's the correct height of a 2.5-inch SSD for an Ultrabook?**
A. 7mm
B. 9mm
C. 3mm
D. 9.5mm

25. **Which of the following digital game distribution platforms is not available on Ubuntu?**
A. Steam
B. Desura
C. Ubuntu Software Center
D. Google Play

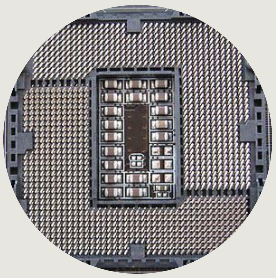
26. **Windows 95's famous startup sound was written by:**
A. Bill Gates
B. Brian Eno
C. The Rolling Stones
D. Pantera

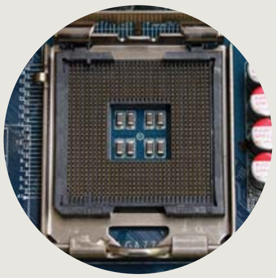
27. **The maximum addressable physical memory in Windows 7 Professional is 192GB. What's the maximum in Windows 8 Professional?**
A. 96GB
B. 192GB
C. 256GB
D. 384GB

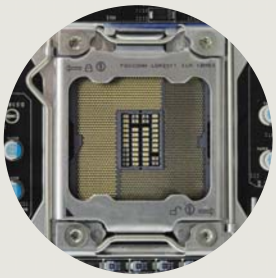
28. **On which interface will two hard drives in RAID 0 have the lowest potential throughput?**
A. A USB 3.0 port
B. A Thunderbolt port
C. Two Intel SATA Revision 3.0 ports on a Z77 motherboard
D. Two SATA Revision 3.0 ports on a PCIe 2.0 x8 RAID card

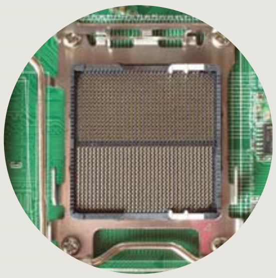
29. **Which of the following Nexus models is explicitly designed with a four-year lifespan?**
A. Nexus 4
B. Nexus 6
C. Nexus 7
D. Nexus 10

30. **An Intel Core i7-3960X CPU fits into which socket?**


A


B


C


D

ANSWERS: 21-D, 22-B, 23-C, 24-A, 25-D, 26-B, 27-B, 28-A, 29-B, 30-C

31. **This type of NAND flash is the most common type in consumer-level SSDs:**
A. SLC
B. MLC
C. MLX
D. DDR

32. **Which actor played Bill Gates in the film *Pirates of the Silicon Valley*?**
A. Kenneth Branagh
B. Michael Emerson
C. Anthony Michael Hall
D. Edward Norton

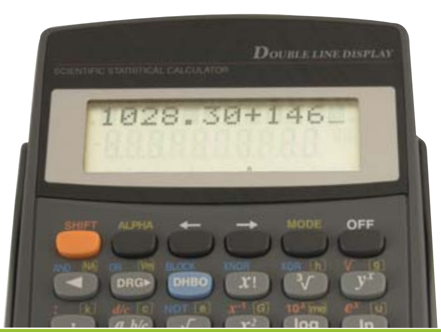
33. **Intel's name is derived from which two words?**
A. Internal Electronics
B. Interconnected Electronics
C. Internet Telecommunications
D. Integrated Electronics

34. **In HTML, what is the correct line of code for image links?**
A. <img source="URL">
B. <image source="URL">
C. <img src="URL">
D. <image src="URL">

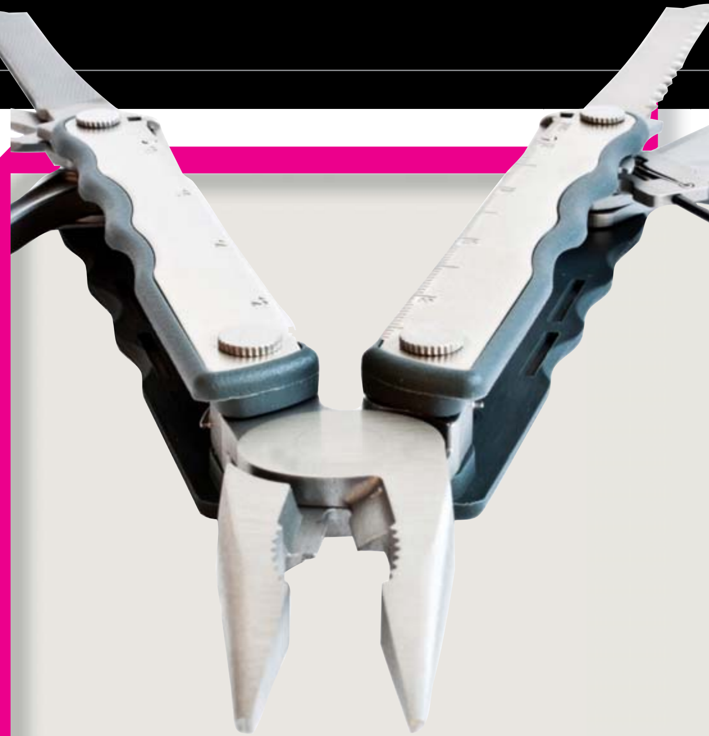
35. **Which one of these is not a type of mechanical key switch for keyboards?**
A. Cherry MX Gray
B. Cherry MX Black
C. White Alps
D. Buckling Spring

36. **Native Command Queuing (NCQ) in current SSDs supports this many commands at once:**
A. NCQ is not supported in SSDs at this time
B. 16
C. 32
D. 64

37. **In computing terms, "Sequoia" refers to which of these?**
A. Microsoft's code-name for Windows 8
B. Nokia smartphone (code-name)
C. IBM supercomputer
D. Programming language



ANSWERS: 31-B, 32-C, 33-D, 34-C, 35-A, 36-C, 37-C



Extra Credit Section:
TRASH TALK

Tech luminaries are known for saying whatever comes to their minds from time to time. Can you recall who said the quotes listed below?

1. "The best way to predict the future is to invent it."
A. Bill Gates
B. Alan Kay
C. Steve Jobs
D. Steve Wozniak

2. "You have zero privacy anyway. Get over it."
A. Steve Jobs
B. Mark Zuckerberg
C. Scott McNealy
D. Bill Gates

3. "As the majority of hobbyists must be aware, most of you steal your software."
A. Lars Ulrich
B. Steve Jobs
C. Sean Parker
D. Bill Gates

ANSWERS: 1-B, 2-C, 3-D

38. **How many processing cores does Nvidia's Tegra 3 chip have?**
A. Two
B. Three
C. Four
D. Five

39. **What was Windows RT previously known as?**
A. Windows Runtime
B. Windows 8
C. Windows x86
D. Windows for ARM

40. **What is the official designation for displays with at least a 3840x2160 resolution, as defined by the International Telecommunication Union (ITU) and Consumer Electronics Association?**
A. Super Hi-Vision
B. 4K High Definition (4K HD)
C. Ultra High Definition (Ultra HD)
D. Quad High Definition (Quad HD)

41. **This CPU family was the first to break the 4GHz barrier on a stock-clocked part:**
A. Pentium 4
B. Athlon FX
C. Athlon XP
D. Celeron

42. **Which video codec features lossless compression?**
A. H.263
B. JPEG 2000
C. MPEG-4
D. VC-3

43. **Which of these CPUs offers the most execution threads?**
A. Atom N570
B. Core 2 E5700
C. Pentium 4 516
D. Phenom X3 8750

44. **This chipset supports the most native SATA 6Gb/s ports:**
A. P67
B. Z77
C. X58
D. 990FX

45. **Which phone's screen has the highest pixel-per-inch rating?**
A. iPhone 5
B. HTC J Butterfly
C. Sony Xperia S
D. Lumia 920

ANSWERS: 38-D, 39-D, 40-C, 41-B, 42-B, 43-A, 44-D, 45-B

KNOW YOUR PLACE

All right, hotshot—it's all over now but the crying. Once you've tallied up your score, meet us below and we'll discuss your future

0–11 CORRECT: NEWBORN NERD
There's only one way to describe this performance: rank incompetence. For your sake, we hope you're in an airport waiting for a plane and found this magazine by chance in the Hudson News. If that's the case, welcome! We're usually nicer than this.

12–23 CORRECT: PRE-PUBESCENT PUNK
Allow us to fold our arms and let out a self-satisfied sniff while slowly nodding in your direction. You've almost done us proud, little one—almost. You still have much to learn, so don't get cocky.

24–35 CORRECT: HALF-WIZARD
OK, OK. We grant you our respect, grudgingly. You've answered almost all of the questions correctly, and your technical wizardry is both immense and prodigious. You should be proud.

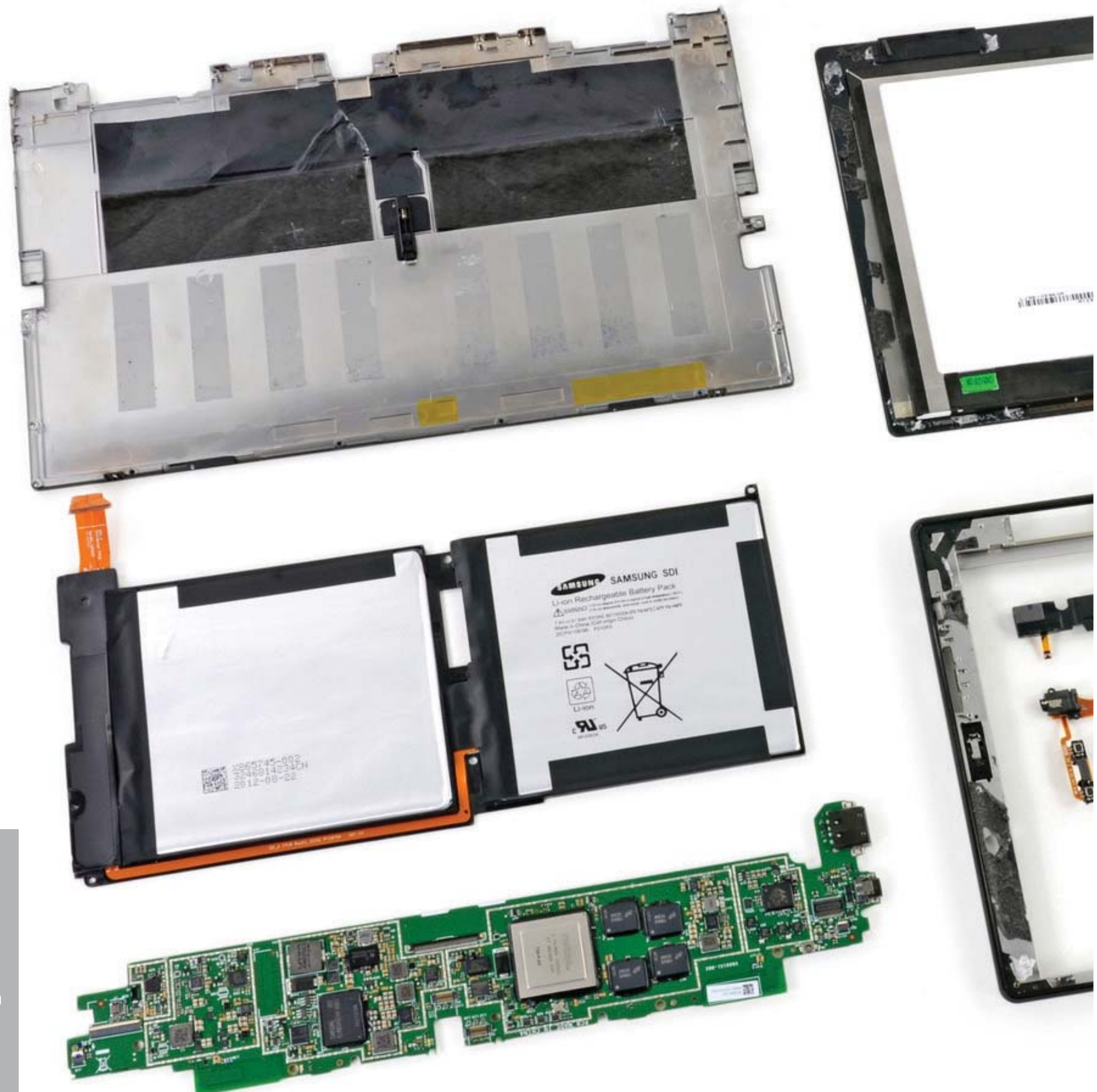
36–48: FULL-WIZARD NECKBEARD ALIEN
Wow. Not only did you get all the questions correct, you knew the nerd quotes as well. We tip our anti-static leash in your direction, and will clink our tubes of thermal paste together in a hearty toast in your honor. You've done us proud. Feel free to add the --FWNA-- tag to all your online avatars with our blessing.

iFixit presents:

AUTOPSY

THIS MONTH WE DISSECT...

Microsoft Surface RT



About iFixit

iFixit is a global community of tinkerers dedicated to helping people fix things through free online repair manuals and teardowns. iFixit believes that everyone has the right to maintain and repair their own products. To learn more, visit www.ifixit.com.



BACKGROUND:

Microsoft is setting the bar for other Windows 8 tablet makers with its Surface RT. The device is getting mostly positive reviews for its handsome looks, nice build quality, and inventive keyboard cover. Here we look at what's doing under the hood.

MAJOR TECH SPECS:

- 10.6-inch ClearType HD display (resolution of 1366x768 pixels)
- Quad-core Nvidia Tegra 3 processor
- 2GB RAM
- 32- or 64GB flash storage
- Wi-Fi (802.11a/b/g/n) + Bluetooth 4.0
- 720p HD front- and rear-facing

KEY FINDINGS:

- We begin our expedition by removing the kickstand. Fun fact: The kickstand is held in place by a few Torx screws.

- After removing a total of 17 T5 Torx screws, (10 under the kickstand and 7 under the camera cover), the rear case comes right off—almost.

- The big question of the day: Is the battery easily removed? Answer: Yes. It's glued in, but it's way easier to remove than on the iPad. The 7.4V, 31.5Wh battery is manufactured by Samsung.

- Several components are modular and replaceable without requiring desoldering.

- It's impossible to remove the keyboard connector without first removing the display from the frame.

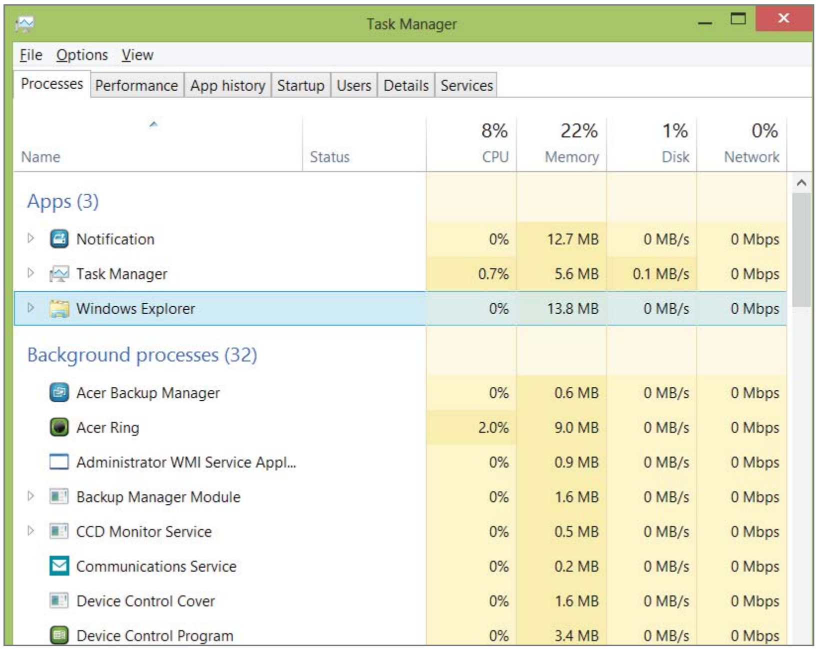
- LCD and glass are fused together and strongly adhered to the case, increasing cost of replacement. You'll have to use a heat gun and lots of patience to gain access to the glass and LCD.

- Microsoft Surface repairability: 4 out of 10.

HOW TO

STEP-BY-STEP GUIDES TO IMPROVING YOUR PC

WINDOWS TIP OF THE MONTH



RESTART WINDOWS EXPLORER

An Explorer.exe crash was one of the most annoying things that could happen in earlier versions of Windows—frequently there wasn't anything you could do but restart your system. In Windows 8, you can find Explorer in the Task Manager, just like any other program. Select it and click the Restart button to fix your problems.



ALEX CASTLE
CONTRIBUTING EDITOR

NINITE FOR A FRESH START

IF YOU'RE going to be updating to Windows 8 any time soon, I strongly recommend that you take the opportunity to back up your important files and get a clean start with a fresh install—and that you use Ninite to make it easier.

I've written about Ninite before, but with Windows 8 out, it's worth another mention. It's a tiny, free app that takes the grunt work out of installing multiple applications. You just go to the Ninite website at www.ninite.com, select the free programs you want to install, then click the Get Installer button to download Ninite, preconfigured to download and install all your chosen software, without you having to do a thing. If you're not convinced, just go to the site and add up all the apps you would end up manually installing within a few weeks—I can count at least 20, easy.

MAKE - USE - CREATE

↘ submit your How To project idea to: comments@maximumpc.com

Install Windows 8 from a USB Drive

YOU'LL NEED THIS

A USB DRIVE
You'll need at least 4GB of space to install Windows 8.

A WINDOWS 8 ISO
You can buy one online at bit.ly/TELHzy or burn one from a Windows 8 install disc.

OVER THE YEARS, Microsoft has made the Windows installation process pretty painless. Once you've set the install application running, it's off to the races: You can sit back, enjoy a nice beverage, and let Microsoft's fantastically efficient OS installation routine do all the work. By the time your Windows 8 OS needs your input, you're practically finished—just a few short steps, if not minutes, away from the tiled joy that is Windows 8 proper.

So, what does that leave us to talk about? Plenty. Ditch your discs, because we're going to show you how to install Windows 8 from a USB key. –DAVID MURPHY

1 PREPARE A USB KEY (THE FAST WAY) If you shun DVDs, love speedier installations, have a digital download of Windows 8, or just plain don't have an optical drive, then it's going to be a USB-based installation for you. And that's just fine; it's a great, quick way to get an operating system onto your hard drive.

» The easiest way to accomplish this process is to already have your hands on a copy of Windows 8's downloadable .iso file—acquirable by purchasing it from Microsoft itself. If you have a flash drive of the appropriate size (at least 4GB or greater, depending on whatever file Microsoft lets you grab), you're golden. Insert your flash drive into a USB slot on your system, and then go grab Microsoft's ill-named Windows 7 USB/DVD Download Tool (bit.ly/gdCUBs).

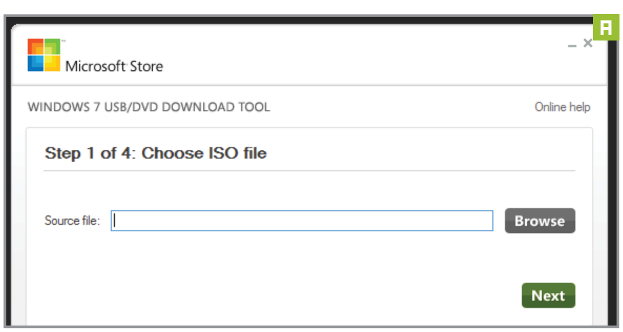
» Install the app and run it. It'll ask you to select an .iso file to be "burnt" onto your USB key (**image A**). Go ahead and select your Windows 8 .iso file—the fact that it's not the same OS as the tool's name has absolutely no bearing on what you're doing.

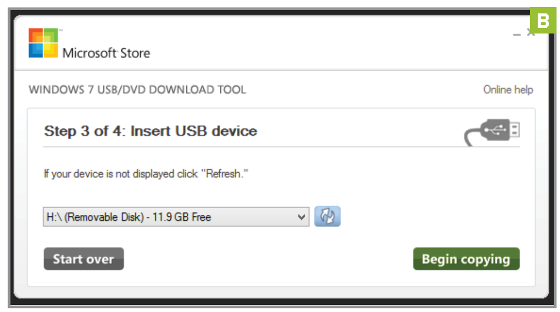
» On the next screen, you'll be asked whether you'd like to create a "Windows 7 backup"—again, ignore the name—on a USB device or DVD. Pick the obvious answer, select your USB key from the drop-down menu (**image B**).

When you're ready to let 'er rip, click "Begin copying!" If the tool needs to format your USB key first, it'll let you know. Couldn't be easier, right?

» Sometimes, however, the Windows 7 USB/DVD Download Tool mucks up—it might tell you that the .iso file you're looking to "burn" isn't actually a recognizable .iso file. You know it is; the Windows tool disagrees. That's a problem.

» There are a number of ways around this problem, but the most simple is to do what the Windows 7 USB/DVD Download Tool is doing, by hand. We'll show you how.





2 MANUALLY PREPARE A USB KEY Start by using a freeware app like Virtual CloneDrive (bit.ly/zS4p) to mount your downloaded Windows 8 installation .iso to a virtual drive within your current Windows OS. Alternatively, insert a Windows 8 DVD into your optical drive.

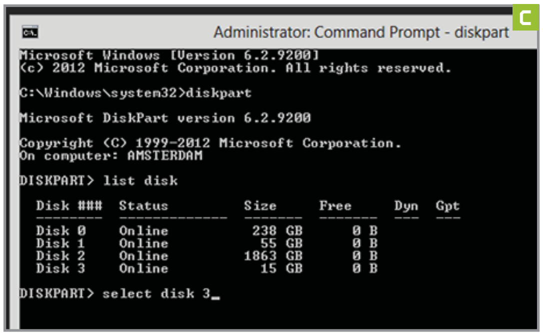
» Next, insert your USB key and fire up a command prompt as an Administrator. Within the command prompt, load Windows' built-in Disk Partition utility by typing `diskpart` and hitting Enter.

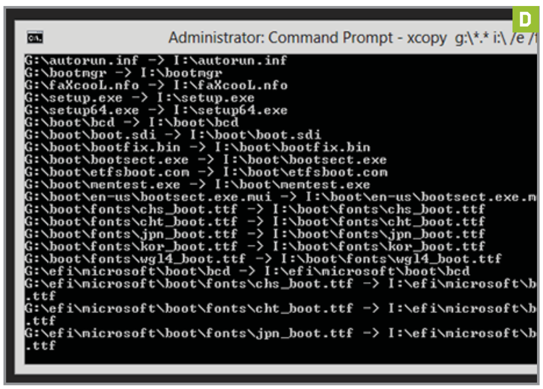
» Within the Disk Partition utility, you'll want to start out by typing `list disk` and hitting Enter. From there, write down the drive number that corresponds to your flash drive—you'll be able to tell, as the capacity of the listed drive should match the capacity of your USB key (**image C**).

» Next, type `select disk #`, where the pound sign is the drive number of your USB key that you just noted. Hit Enter—DiskPart will select the aforementioned drive. Now, type `clean` and hit Enter to remove any existing partitions that might already be on your flash drive. Once the cleaning process is done, type `create partition primary` and hit Enter to do just that. Type `select partition 1` and hit Enter to select your new partition, type `active` and hit Enter, and then type in `format FS=NTFS quick` to quickly reformat your partition with the NTFS filesystem. Type `assign` and hit Enter, and you'll have finished making your USB key bootable!

» Now, it's time to copy your Windows 8 installation

files from their drive—virtual or real—to your USB key. Close diskpart by typing `exit` and hitting Enter. From the command prompt, type `xcopy x:\*.* y:\ /e /f /h`. In our example, however, the "x:\" designation should actually represent the drive letter of your mounted Windows 8 installation .iso file or physical DVD. The "y:\" should be the actual drive letter of your USB key. Once you've made those alterations, hit Enter and let 'er rip—all of the Windows 8 files will start transferring over to your USB key (**image D**).





3 INSTALL WINDOWS 8—UPGRADE OR CLEAN?

Once you're ready to install Windows 8 from your USB key, you'll want to restart your computer and either boot into your motherboard's BIOS or hit the associated hotkey that allows you to access the boot menu during POST. Regardless of which way you go about it, you'll want to make sure your system is set to first boot off of your USB key instead of your existing hard drive.

» Be on the lookout to see if your motherboard requires you to hit a key—any key on your keyboard—to confirm that you want to boot to your USB drive. From there, the actual Windows 8 installation process should look a lot like what you're already used to, if you've ever installed Windows 7 or Windows Vista (**image E**).

» And now's as good a time as any to talk about upgrading versus starting from scratch, since you're likely to be presented with both of these options at the very beginning of the Windows 8 installation process.

» Upgrading can be convenient, but a clean install of an operating system is generally the best way to go. Right now, your computer is likely full of crap—applications you once installed and left behind, an old driver version or two that you've forgotten about, and just general OS bloat that can hit a variety of points around your operating system (from your Start menu to your registry). Consider the installation of a new operating system to be kind of like the equivalent of spring cleaning in the real world. It gives you, and your poor PC, a chance to start anew.



Monitor Your Home Network with NetWorx

YOU'LL NEED THIS

NETWORX
A free network monitoring program available at www.softperfect.com/products/networx.

THESE DAYS, MOST of us pay for high-speed Internet connections. If you do, you know that it can be a major monthly expenditure.

NetWorx helps you get the most out of your investment. It lets you keep tabs on the performance of your network and tells you just where any problems might lie. Has an Ethernet cable become trapped in a door, kinked, and broken? Is a Wi-Fi signal being hampered by walls in the way? If you aren't getting the sorts of speeds you expect from your equipment, NetWorx is a great way to find out why.

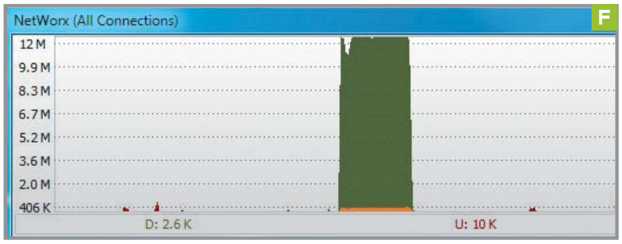
NetWorx can monitor your whole network and your router too, so if all of your gear is functioning correctly, you can pin the poor-performance blame squarely on your broadband provider. There's no sense paying for bad service. –ALEX COX

1 DOWNLOAD AND INSTALL NETWORX Get NetWorx from www.softperfect.com/products/networx. Run the installer and click Next on each page. We recommend you install the Desk Band component if you want to be able to see your network traffic at a glance. Click Finish at the end of the installation procedure and NetWorx will launch its initial configuration wizard.

» You shouldn't need to change much in the configuration wizard. During Step 2, you may want to define which connection you're watching if you use both wired and wireless networks, but "All connections" is fine for most purposes. Once you've clicked Finish, an icon will appear in your taskbar. If it disappears, as it did on ours, expand the taskbar and drag the icon onto the main area.

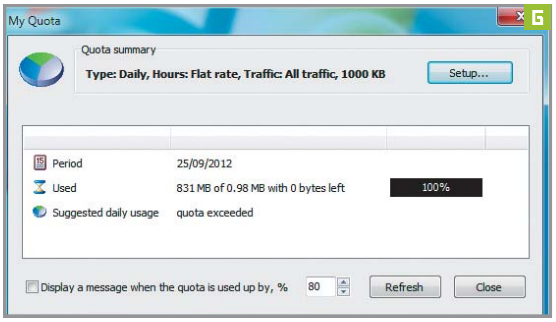
2 VIEW YOUR NETWORK TRAFFIC If you chose to install the Desk Band, you should be aware that it's hidden by default, which is rather silly because it's a tool that's only useful if it's visible all the time. Right-click your taskbar, go to Toolbars and click NetWorx Desk Bar to bring it to the front. You can drag the slider on the left to extend or shrink the graph, which updates whenever there's any network traffic, or right-click it to access the NetWorx menu.

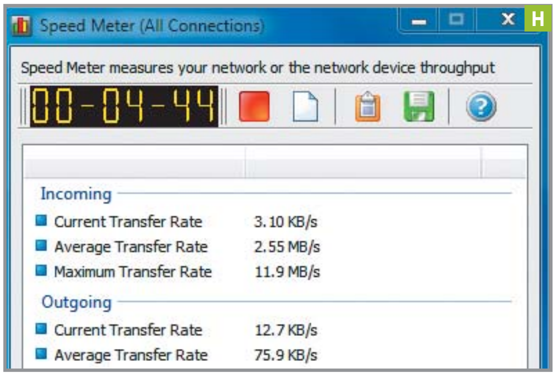
» If you don't want to use the Desk Band, you can see an always-on-top graph of your network traffic by right-clicking the taskbar icon and selecting Show Graph (**image F**). You can drag its corners to make it bigger if you need to. Green spikes represent download traffic, red spikes represent upload traffic, and yellow spikes correspond to times when traffic was moving in both directions.



3 MANAGE YOUR USE Right-click the taskbar icon and select Quota. You can use this interface to define the maximum amount of network traffic you want to use over a specific period, which is useful if you have a capped Internet connection (**image G**). NetWorx won't cut off your network, but it will warn you when you're approaching your limit. Click Setup, choose your options, and input your intended limit in KB.

» The Speed Meter section gives you details of your network speed, or the lack thereof (**image H**). We'd suggest running the monitor at the start of a typical day and checking its results at the end, or running it before a heavy download or upload to get a good handle on the speed levels you're achieving. Click the disc icon to save your results, so you can compare multiple days later on.



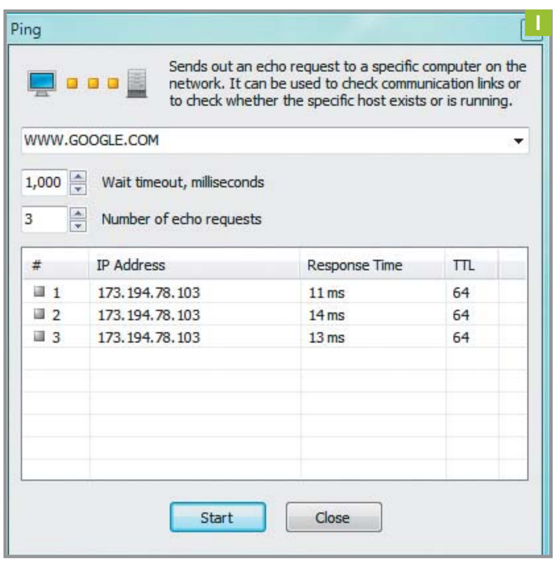


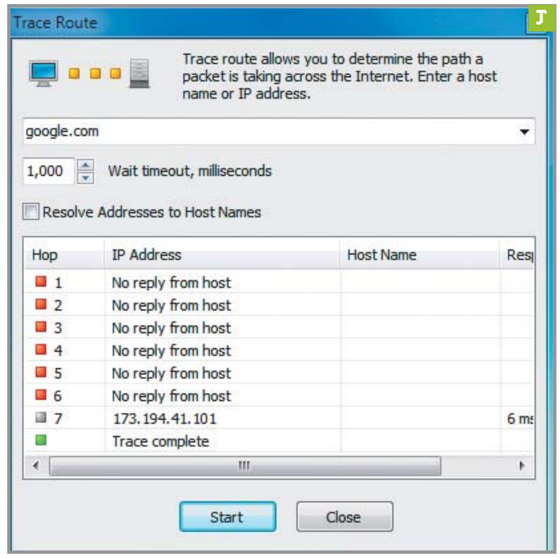
4 TROUBLESHOOT YOUR CONNECTION Say you've got a network issue. Although you can't use NetWorx to solve it, you can use its tools to find out exactly where the problem lies. Start with the Ping window, which sends a quick, sonar-like "ping" to any IP address you choose (**image I**). If the message is returned, the connection is working. If it's not, or if it takes a long time to bounce back, there's a problem between the computers.

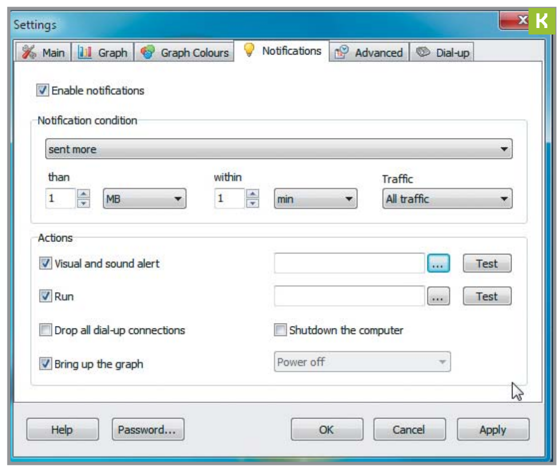
» A trace route is much like a ping, except it bounces from your machine to a particular computer on the web, giving you data about the route it's taken and the number of "hops" along the way (**image J**). Enter a web address on the Trace Route screen and it will attempt to get a reply from that site. If it doesn't, look at the route taken and you should be able to tell where the problem is.

» If you have a wired and a wireless network connection, you can restrict NetWorx to one or the other in the Settings page. In the Main tab, click the drop-down box under "Monitored interfaces" and select the appropriate option. You can also monitor your router rather than a single computer—useful in a family home. Click the link below and enter the IP address of your router.

» Two other areas to note on the Settings window are the Notifications tab (**image K**), in which you can ask NetWorx to tell you if certain conditions are met, and the Synchronization section of the Advanced tab, which collects data from all local machines on which NetWorx is installed. Once that's done, you're watching your whole network for the slightest hiccup. ⏻







BUILD IT

JOSH NOREM **SENIOR EDITOR**



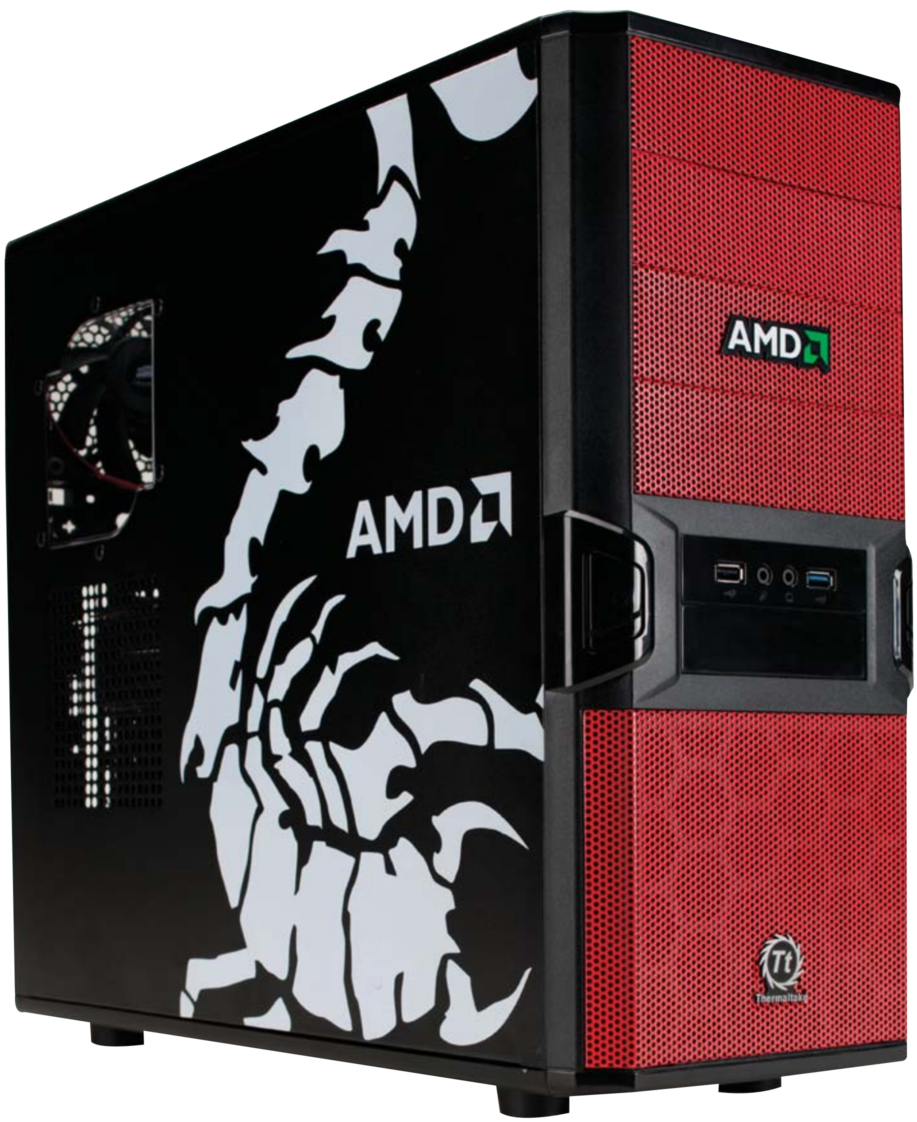
The Ultimate AMD Gaming Rig

We build a machine that's red and black to hopefully beat our benchmarks black and blue

LENGTH OF TIME: **2 HOURS** | LEVEL OF DIFFICULTY: **EASY**

THE MISSION Variety is the spice of the Lab, so this month we decided to eschew our traditional builds and go with one you don't see every day—an all-AMD computer, built with (most of) the best parts we could get our hands on. We're sure some of you will question the purpose of this build, so our pre-emptive answer is we built it because we could, and we were curious to see how a balls-out AMD build would benchmark, as we haven't seen an over-the-top AMD rig since *The Matrix: Revolutions* let us down. Plus, everyone is always ragging on us for ignoring AMD, so here you go, AMD enthusiasts—an entire PC built just for you.

The build was timely, since AMD has just released its new "Vishera" Piledriver CPU, the 4GHz FX-8350 (or "Octomom," as we like to call it). We paired it with a totally jacked HD 7970 from Asus and a small army of AMD-ish components, which we figured would make for an interesting build. Finally, we've heard your feedback about how you don't need to see another picture of RAM being inserted into its slot, so this month we're going to talk about our component selection and the building *process* instead of showing you how we actually built it.



IT'S TIME TO CHOOSE

The impetus for this system was the release of the new Vishera CPU from AMD, along with an updated version of the Asus Crosshair V Formula Z motherboard running the 990FX chipset. We had just received both of these brand-new parts, so we knew what we had to do—take a lunch break to consider our options. While tossing back root beers, we formulated the basis of the system—an AMD processor and motherboard were a given, but what else? We had yet to sample the overclocked HD 7970 DirectCU II TOP from Asus, so we added that to the equation. We then remembered AMD-branded RAM had just been announced, so we added that to the ticket as we ordered another round of brewskies. To finish the system, we settled on the Thermaltake V3 AMD edition chassis, some red-band Corsair AF120 case fans, and a red Corsair Force GS SSD, as well, to tie the room together.

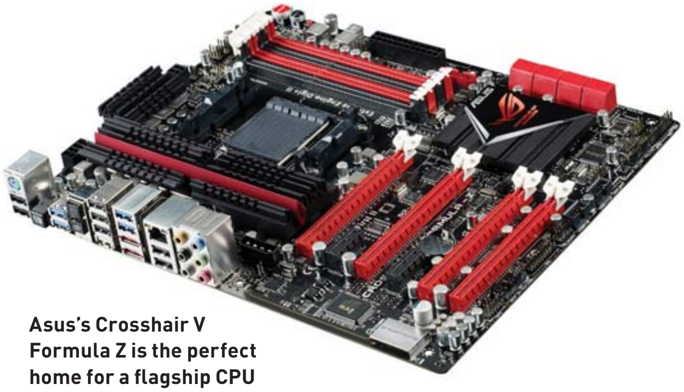
INGREDIENTS

	PART	URL	PRICE
Case	Thermaltake V3 AMD Edition	www.thermaltakeusa.com	$50
PSU	Corsair TX750M 750W	www.corsair.com	$115
Mobo	Asus Crosshair V Formula Z	www.asus.com	$230
CPU	AMD 4GHz FX-8350	www.amd.com	$220
Cooler	Cooler Master Hyper 212 Plus	www.coolermaster.com	$20
GPU	Asus Radeon HD 7970 DirectCU II TOP	ww.asus.com	$450
RAM	8GB AMD Performance Edition DDR3/1600	www.amd.com	$50
Hard Drive	WD RE 4TB	www.wd.com	$460
SSD	Corsair Force GS SSD 240GB	www.corsair.com	$220
Fans	Corsair AF120 Quiet Edition (x2)	www.corsair.com	$28
OS	Windows 7 Professional 64-bit	www.microsoft.com	$140
Total			$1,983

1 THE CPU AND MOTHERBOARD

AMD'S NEW CPU is the first proc we've ever seen that comes clocked from the factory at 4GHz, and it's a surprisingly affordable eight-core processor, too. Though 4GHz is the highest stock-clock speed we've ever seen, don't get too excited. The FX-8350 is not even in the same universe as something like a hexa-core Intel Core i7-3960X, despite having two additional cores and a clock-speed advantage.

The motherboard is the latest version of the Asus Crosshair V and has every feature imaginable, including an actual digital kitchen sink. It's running the AMD 990FX chipset and dishes up a total of eight SATA 6Gb/s ports and two eSATA 6Gb/s ports as well as a new SupremeFX III audio chip and three PCI Express x16 slots for three-way SLI or CrossFire. Plus, the paint job is totally righteous.



Asus's Crosshair V Formula Z is the perfect home for a flagship CPU like the FX-8350.

2 OUR TOP PICK

OF COURSE we went with a Radeon HD 7970 for this build—you would do the same thing if you were in our statically shielded shoes. But instead of just going with a Nilla Wafer card, we rang up Asus and requested its overclocked bitch-maker, the HD 7970 DirectCU II TOP. In English, this means the card is a 7970 but it has the company's ludicrously huge DirectCU II triple-slot cooler, and TOP means its core clock speed is nudged up to 1GHz from its stock speed of 925MHz. This card requires two 8-pin connectors and can power up to six displays at once, and did we mention it's effing massive?



This overclocked, triple-slot pixel-pusher runs neck-and-neck with the GTX 680 and is totally silent.

3 WE MAKE OUR CASE

WE CAN ALREADY HEAR the smack-talk about taking a $50 case and stuffing two-grand worth of gear into it. Point taken—and yes, we chose it for its color scheme. But since our build wasn't too ambitious, the case actually worked out OK, though we did experience a few issues. The first sign of trouble was a warning in the manual not to use a video card that exceeds 10.4 inches. We stared at our 11-inch GPU, gritted our teeth, and wedged it into the PCIe slot with… no problem at all. It worked perfectly. The second issue was the rear-facing 3.5-inch hard drive bays, which we haven't seen in a while and did not miss. Installing drives once the mobo and GPU are inside is a PITA, plain and simple. The biggest issue we had was a lack of holes to route our PSU cables, so please cut us some slack on that (we know you won't).



Thermaltake's V3 AMD is specifically designed for AMD processors and RAM. OK, we made that up.

4 STORAGE DUTIES

OUR SSD SELECTION will probably be another controversial choice, but we picked it for two reasons. First, it's red. Second, it's fast. The second part is crucial, because if the drive was red and *slow*, it would not be in this rig, period. But since it's fast, and red, in it went. Though we never officially reviewed this drive, it's the flagship of Corsair's previous Force lineup, and features fast MLC Toggle NAND and a SandForce SF-2281 controller, so it's got some hardware cred. In testing, it hummed right along at 464MB/412MB read and write speeds.

Since no man can survive on an SSD alone, we paired it with WD's cavernous 4TB RE enterprise drive, which spins at 7,200rpm and is big enough to hold our multimedia stash, barely. Since the Thermaltake case only has 4 3.5-inch drive bays, we figured we had better go big on this one.



A SandForce SSD from Corsair and 4TB of rotating storage should serve our file-hoarding needs nicely.

5 MORE POWER

OUR PSU CHOICE WAS made interesting by the fact that the original no-name model we chose failed during testing. The system would boot fine and run normally until we really stressed it out, at which point we found ourselves staring at a matrix of orange squares on our LCD. We tried updating the mobo's BIOS, updating our video drivers, and even swapping the power cables, but nothing worked. Finally, we grabbed the Corsair TX750M and plugged it into the 24-pin and 8-pin connectors, leaving the original PSU attached to the GPU, and everything worked just fine. Eventually, we yanked the original PSU out and went with Corsair. This just reinforces an age-old lesson: Don't get cheap when it comes to your rig's power supply. It's not worth the headache.

An inadequate power supply put a halt to our benchmarking. Thankfully, Corsair stepped in and saved the day.



6 RED RAM

AMD HAS BEGUN selling branded memory, so we figured we'd plop some sticks into the machine to see if anything bad would happen. The RAM is made by Patriot and VisionTek but is validated by AMD for use with its CPUs and chipsets, so take that for what it's worth. The company is offering branded sticks in 2GB, 4GB, and 8GB modules in four flavors: Value, Entertainment, Performance, and Radeon. We used 8GB of Performance RAM, which was clocked at 1,600MHz at 1.5V out of the box. Even though AMD warns users against overclocking, it also indicates on its website that it can be safely run at 1.65V in order to achieve more aggressive timings.



We tried some AMD Performance Edition RAM and are happy to report it was rock solid and stable.



1. The V3 case only comes with one 12cm exhaust fan, but we replaced it with two Corsair AF120 Quiet case fans because they look snazzy and are whisper-quiet.

2. We originally wanted a Phanteks cooler in red, but a time crunch forced us to go with our favorite cooler of the past year, the Cooler Master Hyper 212 Plus. It's still the best bang-for-the-buck cooler in the land and is amazingly quiet.

3. Thermaltake says this case isn't made for extra-long GPUs and extra-tall CPU coolers, but both of ours fit with zero clearance problems.

4. The Thermaltake V3 AMD edition lacks holes for cable routing, so we ended up with a traffic jam in the lower quadrant of the chassis.

THE NUMBERS AREN'T PRETTY

AS YOU LOOK at the benchmark chart below, you should hear the sad trombone sound from *The Price is Right* playing in your head because this system got smoked by our zero-point rig, which has a hexa-core Sandy Bridge-E and GeForce GTX 690 video card. Its best result was in the x264 HD 5.0 encoding test, where our AMD rig lost by 30 percent to Core i7-3930K, its least punishing defeat, which was likely the result of the AMD part's higher clock speed. In every other test the extra cores and clocks that AMD brings to the table didn't make a difference against Intel's more efficient microarchitecture, even if it's an older generation. We witnessed a beatdown in all the CPU-based tests, including Adobe Premiere Pro 6, where the Vishera system took almost 1.5 hours to complete a test that took our SNB-E machine just 33 minutes. We saw the same disparity in every other test, but it's not a surprise since Vishera was not designed to go head-to-head with a $1,000 Intel Core i7 CPU. Sadly, our HD 7970 also got smacked around in both 3DMark and Batman, where it was picked on by the zero-point's GTX 690 GPU. You can interpret this two ways: the first is, hey, it's no so bad, considering that the ZP's CPU and GPU cost twice as much as the AMD's parts. The other way is, damn, those Sandy Bridge-E CPUs are fast.

BENCHMARKS

	ZERO POINT	
Premiere Pro CS6 (sec)	2,000	5,160 (-61%)
Stitch.Efx 2.0 (sec)	831	1,489 (-44%)
ProShow Producer 5.0 (sec)	1,446	2,902 (-50%)
x264 HD 5.0 (fps)	21.1	14.8 (-30%)
Batman: Arkam City (fps)	76	51 (-33%)
3DMark 11	5,847	3,122 (-47%)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our current desktop test bed consists of a hexa-core 3.2GHz Core i7-3930K @ 3.8GHz, 8GB of Corsair DDR3/1600, on an Asus Sabertooth X79 motherboard. We are running a GeForce GTX 690, an OCZ Vertex 3 SSD, and 64-bit Windows 7 Professional.

REVIEWS

TESTED. REVIEWED. VERDICTIZED.

INSIDE



THERMALTAKE WATER2.0 CPU COOLER
PAGE 86



The Bolt offers top-end performance in the slimmest gaming PC available.

Digital Storm Bolt

It's confirmed: The PC is going small

ONE IS AN OUTLIER. Two a coincidence. But three, as we know from News Media Statistics 101, is a crystal-clear trend.

And that's just what we have with Digital Storm's Bolt, which follows on the heels of Alienware's X51 (reviewed May 2012) and Falcon Northwest's Tiki (reviewed September 2012): proof that the PC is making an assault on the living room. Of course, the "assault on the living room" is our own private fantasy about the PC pushing the traditional game console overboard—Digital Storm just presents the box as a small PC (although we will note that the machine came with a wireless keyboard and game controller).

This isn't some crazy conspiracy theory. Think about it: The timing is perfect for the PC to muscle out game consoles. Consoles are crawling along in the equivalent of a Model T while the PC speeds by in a 2013 Corvette 427.

For example: The Xbox 360 is rolling basically an ATI X1900 XT and a 3.2GHz tri-core Power PC using an in-order execution engine, and 512MB of 700MHz GDDR3 is shared between the CPU and GPU. Compare that to the Bolt's Core i7-3770K chip, 16GB of DDR3/1600, and GeForce GTX 680 card.

Digital Storm doesn't just settle for the 3770K's stock 3.5GHz, either. The company pushed the Ivy Bridge processor to a stable 4.4GHz. That's about 200MHz faster than Falcon Northwest's similarly spec'd Tiki.

There's a cost with the performance, though. The prototype Bolt we reviewed would get too loud for our tastes under heavy gaming and CPU loads. Digital Storm said it has licked most of the noise issue with an additional PSU fan and proved it by showing us a second prototype unit with the modification. Indeed, the sound was quieter—but still not as quiet as the liquid-cooled Tiki or the X51. It's not horrible, but you will need to crank up the volume while gaming.

At 4.4GHz, the IVB in the Bolt can't outmuscle our zero-point's hexa-core Core i7-3960K overclocked to 3.8GHz in the multithreaded tasks, but it does offer 8 percent and 9 percent benefits in the tests that aren't reliant on mega cores to run. Against its contemporaries, however, the Bolt does far better. Given its 200MHz advantage over the Falcon Northwest Tiki, the Bolt had a small advantage in computing tasks. In gaming though, the Bolt bested the Tiki by an impressive 13 percent in 3DMark11 and 7 percent in Batman: Arkham City. Since both boxes use similarly clocked GeForce GTX 680s, we're attributing the difference to the higher CPU clocks of the Bolt as well as updated driver optimizations Nvidia has done since we reviewed the Tiki.

The Bolt's build is unique. Rather than contracting with a large vendor to put a new façade on its existing case, DStorm had the chassis built to its design specs by a local shop. The custom case is but 3.6 inches wide, which Digital Storm says is the thinnest chassis out today. And like the FNW Tiki, the Bolt relies on an internal PSU rather than an external power brick like Alienware's X51. The company says the chassis can fit a GeForce GTX 690 and run it on the 500-watt PSU, but the acoustics would simply be too much. Our biggest complaint with the Bolt is the same complaint we had about the Tiki: We want a horizontal mode. The upright formfactor is not a deal breaker, but most people who run a PC near their TV will want to lay it flat.

Overall, we like the Bolt. It's small, fast, and a relatively good deal compared to the FNW Tiki, which tips the scales at $4K. The Bolt comes in under $2K (sans the nifty liquid cooler, RAID, and granite base of the Tiki). The Bolt, however, does support a RAID configuration and its case is locally sourced—and organic. OK, maybe not organic, but it is made in the USA. –**GORDON MAH UNG**

VERDICT 9 KICK ASS!

Digital Storm Bolt

➕ **USAIN BOLT** Relatively low-priced for a custom rig.

➖ **SELF-SEALING STEM BOLT** Paint job could be better; no horizontal mode.

$1,950, Digital Storm Bolt

BENCHMARKS

	ZERO POINT	
Premiere Pro CS6 (sec)	2,000	2,580 (-22%)
Stitch.Efx 2.0 (sec)	831	760
ProShow Producer 5.0 (sec)	1,446	1,338
x264 HD 5.0 (fps)	21.1	17.1 (-19%)
Batman: Arkam City (fps)	76.0	44.0 (-42%)
3DMark 11	5,847	3,571 (-39%)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our current desktop test bed consists of a hexa-core 3.2GHz Core i7-3930K @ 3.8GHz, 8GB of Corsair DDR3/1600, on an Asus Sabertooth X79 motherboard. We are running a GeForce GTX 690, an OCZ Vertex 3 SSD, and 64-bit Windows 7 Professional.

SPECIFICATIONS

Processor	Intel Core i7-3770K@4.4GHz
Mobo	Asus P8Z77-I Deluxe
RAM	16GB DDR3/1600
Video Card	GeForce GTX 680
Sound Card	Onboard
Storage	120GB Corsair SSD, 1TB 7,200 HDD
Optical	DVD combo drive
Case/PSU	Custom / Lite-On 500 Watt 1U PSU



Intel's new 335 Series looks the same as other Intel drives on the outside but has new 20nm NAND flash innards.



Corsair's Neutron GTX is serious business with 2 million hours MTBF and a five-year warranty.

SSD Shakedown

Corsair goes big, and Intel revamps its NAND

This month, we've got two very different SSDs for you to consider—a massive (and fast) Corsair Neutron GTX 480GB and a brand-new SandForce-powered SSD from Intel. These two drives don't compete per se, but they both bring something new to the table. The Corsair GTX combines blinding speed, huge capacity, and industrial-strength endurance, while the Intel is the first SSD to strut its stuff with super-small 20nm NAND flash. We strapped them both to an updated Z77 chipset test bench and let the fur fly. –JOSH NOREM

CORSAIR NEUTRON GTX 480GB

When we last paid a visit to the Corsair Neutron GTX in the December 2012 issue, we declared it one wicked-fast SSD, but it was unfortunately nicked at the finish line by the Samsung 840 Pro. Corsair isn't too worried about that, though, and seems to have adopted an "onward and upward" mentality, which we see manifested in the capacious 480GB variant of the GTX that landed on our test bed this month. Like its smaller-capacity brethren, it's sporting a brand-spankin'-new Link A Media controller (LAMD)—exclusive to Corsair at this time—and it's wedded to Toshiba 24nm toggle-NAND. Running the show is an ARM microcontroller that pumps data through a SATA 6Gb/s connection. The Neutron GTX is also a slim 7mm jobbie, so it'll fit in even the most anorexic Ultrabooks. Desktop jockeys are also given consideration via the included 3.5-inch bay adapter.

Though it's natural to focus on the specs of a drive like this, it's worth pointing out that this thing is built to last with a mean time between failure rating of 2 million hours, the longest rating you'll ever see for an SSD. Corsair also backs it up with a five-year warranty, which is an industry-topper.

In testing, the GTX tore up our benchmark charts in heavily queued workloads, dominating even its old foe the Samsung 840 Pro. This dominance was seen in the Iometer test, where we queue up 32 4KB write requests and hammer the drive mercilessly, as well as in the AS SSD 4KB incompressible data test where the GTX even outpaced the Samsung 840 Pro by a hair in write speeds.

The Neutron GTX also performed extremely well in compressible 64KB sequential read and write tests, throwing down a sequential read speed of 491MB/s and write speed of 391MB/s, placing it just slightly behind the Samsung drive in read speeds but a bit further behind in write speeds. In CrystalDiskMark the Neutron GTX also fell slightly below its 500MB claimed speeds, at 436MB/s and 473MB/s, making this the drive's worst showing in our benchmark suite. Admittedly, nobody would argue that 400MB/s speeds are slow, but when compared to its competition, the drive is slightly off the mark here.

Finally, we come to our PCMark Vantage "real-world" test, where the Neutron took our number one spot by a decisive margin, its score almost double that of some older drives like the Crucial M4 and OCZ Vertex 4.

When we previously reviewed the 240GB version of this drive, we awarded it a 9 verdict, and that ruling stands. The drive is amazingly fast in a lot of tests, but not all. It's certainly the fastest drive we've ever tested at this capacity, though, so as we begin to transition to 512GB, the Neutron GTX will no doubt be a serious contender.

VERDICT 9

Corsair Neutron GTX 480GB

$560, www.corsair.com

INTEL 335 SERIES SSD 240GB

The last time we heard from Intel's SDD department, it was throwing around its performance-oriented 520 Series SSD that rocked a SandForce controller and custom Intel firmware with 25nm NAND flash. That drive earned a 9 verdict from us (April 2012) but no Kick Ass award, as its performance was about equal to its peers' but not better. The crux of that drive was SandForce performance with Intel reliability, and though that's a potent combo, it's one that came in the form of a higher price tag. With Intel's new budget-oriented 335 Series SSD, that tax is gone, as this drive is priced right below $200, the current sweet spot for 240/256GB SSDs. It still has the same SandForce SF-2281 controller and the same Intel reliability, but includes new smaller-die 20nm MLC NAND flash. The smaller flash marks the industry's foray into the 20nm era, and Intel is the first manufacturer to take us there.

We know it's hard to get excited about a smaller manufacturing process for NAND flash; the benefits are reduced power consumption, higher capacities, and lower prices at some point in the future, but it doesn't bring an automatic performance gain, so keep your hopes in check. Smaller flash aside, the SSD uses a familiar metallic 2.5-inch chassis, and it stands at 9.5mm, making it too tall for Ultrabooks. It's running on a SATA 6Gb/s interface and comes with a three-year warranty, which is typical for drives in this price range.

In testing, we found the 335 Series drive to be an above-average performer, but sadly, there's no improvement whatsoever from the previous generation of drives. If anything, we saw a decrease in performance in certain tests compared to the Intel 520 drive, which isn't an apples-to-apples comparison, as that drive is more tuned for performance than the 335 series. Sadly, we never received an older 330 drive (which this drive is based upon) for comparison's sake.

Starting with sustained read and write speeds, we saw the Intel 335 hitting 462MB/s and 324MB/s, respectively, giving it mid-pack status. In our compressible-data test it rocked the hizzy, though, racking up impressive 507MB/s read and 413MB/s write speeds that were only outpaced by the mighty Samsung 840 Pro—an impressive feat indeed. When dealing with incompressible data such as JPEGs and video, the 335 drive equaled the performance of the Intel 520 Series drive in read speeds, and placed shoulder-to-shoulder with the Corsair GTX and Samsung 840 Pro.

In our 4K random-write test with 32 commands queued up, the Intel 335 again placed well among other drives in its class, with 57,412 IOPS, but that score is no match for its older sibling Intel 520, which hit 81,624 IOPS in the same test. In our real-world PCMark Vantage test, the 335 again scored about mid-pack, but below the Intel 520 Series drive by a considerable margin. We also noted an anomaly where the drive's lifespan decreased faster than expected, dropping down to 93 percent after just a few terabytes had been written to it. Intel claims this is a bug in the reporting software, and a firmware update will resolve the issue.

Overall, the Intel 335 series is a reasonably fast drive that matched the Intel 520 in some tests but was slower in others, making it a mixed bag. It's priced much lower than what we're used to seeing from Intel, however, which is a step in the right direction but ultimately not enough to move the needle too much on our verdict chart. We're not hating on this drive, but suffice to say we're more excited about Intel's next drive, which will hopefully use a new iteration of its SandForce controller.

VERDICT 7

Intel 335 Series SSD 240GB

$185, www.intel.com

BENCHMARKS

	Corsair Neutron GTX	Intel 335 Series	Samsung 840 Pro	Crucial M4	Intel Series 520	OCZ Vertex 4
Controller	LAMD	SF-2281	Samsung	Marvel 9174	SF-2281	Indilinx Everest
Capacity	480GB	240GB	256GB	256GB	240GB	256GB
Price	$560	$185	$270	$200	$240	$200
CrystalDiskMark						
Avg. Sustained Read (MB/s)	436.3	462	**515.7**	499	478.2	425
Avg. Sustained Write (MB/s)	473.5	324	**499.1**	277	245	383
AS SSD						
4KB Read (IOPS)	**6,942**	5,759	6,917	5,702	5,793	6,475
4KB Write (IOPS)	16,722	16,719	16,582	16,858	**17,213**	15,997
ATTO						
64KB File Read (MB/s)	491	507	**514**	275	510.2	425
64KB File Write (MB/s)	349	413	**512**	436	318.1	383
Iometer						
4KB Random Write (32QD)	**83,593**	57,412	70,641	43,411	81,624	28,206
PCMark Vantage x64	**72,058**	43,324	56,608	40,503	66,691	38,251

Best scores are bolded. Our current test bed is a 3.4GHz Core i5-3570K processor on an Asus P8Z77-V Premium motherboard running Windows 7 Professional 64-bit. All tests used onboard 6Gb/s SATA ports with the latest Intel drivers.



One look and you know this is an expensive card.

EVGA GTX 690

Hail to the king



WHEN NVIDIA launched the GTX 680 back in May, it handily cleaned the AMD HD 7970's clock, but that wasn't enough for Nvidia (or us, to be honest). So Nvidia did what any rational power-hungry company would do, and married two GK104 GPUs to a single PCB, connected them with a 48-lane PLX PCIe 3.0 bridge chip, and dubbed it the GTX 690. It now reigns as the only current-gen dual-GPU card available, since AMD's dual HD 7970 card never officially materialized. Though we've reviewed the GTX 690 before, and also chose it for our lust-inspiring Dream Machine 2012, we had previously sampled the Asus board, so this month we're checking out the other GeForce GTX 690, from EVGA. The two cards are clocked the same—slightly lower than a stock-clocked GTX 680 on each GPU—but the EVGA card is $50 less expensive.

Like the other GTX 690 cards we've seen, the EVGA card looks precisely how a $1,000 video card should look, because if you're dropping a grand on a GPU you don't want a chintzy plastic shroud or an aluminum heatsink. Oh, no—you want some cheese on that burger. The GTX 690 is practically dripping, starting with the illuminated GeForce GTX logo on the side of the card that glows lime green when the card has power; it's enough to make us want to bust out the Dremel tool and install a case window. The second tricked-out bit is the cooling mechanism itself, which is crafted from chromium-plated cast aluminum and feels as solid as a section of rebar.

The business end of the GTX 690 features two full-blown GK104 GPUs with nothing changed from their configuration in the GTX 680 (aside from the previously mentioned underclocking). This 11-inch card is hoarding a total of 3,072 CUDA cores, 64 ROPs, 256 texture units, and 4GB of RAM. Given its specs, it's not surprising to see how well it performs, but in comparison to the Asus card and two GTX 680s in SLI, it gets interesting. The EVGA card was mostly faster than the Asus card, but we chalk up some of that to improved drivers since our last review. The Shogun 2 differential is from a game patch, however, as that game suddenly jumped 15fps in our tests a few weeks ago regardless of driver. As you can see, though, the EVGA is not quite as fast as a true SLI setup, but it will produce less heat and only requires two 8-pin PSU connectors instead of four 6-pin connectors, so you don't need to upgrade your PSU to run the GTX 690. We've even run it on a 650W PSU with zero problems. All in all, it's pretty damn impressive.

If you need one more reason to consider a GTX 690, bank account willing, it's the fastest single card in existence by a long shot. And if your bank account is in the Cayman Islands, you can always run two in SLI just like Dream Machine 2012.

–JOSH NOREM

BENCHMARKS

	EVGA GTX 690	Asus GTX 690	Nvidia GTX 680 SLI	AMD Radeon HD 7970 CrossFireX	EVGA GTX 680
3DMark 2011 Perf	15,060	15,056	**15,804**	13,817	9,541
3DMark 2011 Extreme	5,877	5,832	**6,072**	5,352	3,249
3DMark Vantage Perf	43,707	44,501	**45,205**	44,180	34,613
Unigine Heaven 2.5 (fps)	58.6	59.8	**60.8**	57.6	24.5
Shogun 2 (fps)	54.2	35.4	38	**75**	33.2
Far Cry 2 / Long (fps)	**206.7**	183.7	187.9	186.3	107.3
Dirt 3 (fps)	116.1	123	**124.5**	114.5	70.8
Metro 2033 (fps)	**42**	29	29.5	29	24.6
STALKER: CoP DX11 (fps)	67.2	64.2	66.1	**76.7**	36.6
Just Cause 2 (fps)	74.1	80	81.03	**91.85**	53.8
Batman: Arkham City (fps)	**105**	103	104	86	63

Best scores are bolded. Our test bed is a 3.33GHz Core i7-3960X Extreme Edition in an Asus P9X79 motherboard with 16GB of DDR3/1600 and a Corsair AX1200 PSU. The OS is 64-bit Windows 7 Ultimate. All games are run at 2560x1600 with 4x AA and all settings maxed out, except for the 3DMark tests, and Shogun 2, which is run at 1080pHigh settings.

VERDICT 9 KICK ASS!

EVGA GTX 690

➕ **KITTY PURRY** Smokin'-fast; looks badass; almost as fast as two cards in SLI.

➖ **KATY PERRY** Expensive; exhausted air is non-directional.

$1,000, www.evga.com



You can only connect a total of two fans to the case's built-in controller unless you pick up some additional adapters on your own.

Zalman Z9-U3

Don't forget to include $5 for a screwdriver, too

ZALMAN'S Z9-U3 ISN'T a great case but, at a cost of $70, it would be difficult to expect this mid-tower chassis to move many mountains.

The case's design isn't all that different from the company's previously released Z9 chassis. Changes include the removal of the case's grilled side in favor of an acrylic window and the happy inclusion of USB 3.0 connectivity on the chassis's front—two ports, with internal headers. Although the switch from a grilled side to acrylic means that you're down two potential fan slots, the case supports five fans in total (ranging from 12cm to 14cm) and comes with three preinstalled for you.

Fans seem as if they would be a big deal on the Z9-U3, mainly due to Zalman's new inclusion of a "controller" dial on the case's front. Presumably, this allows you to adjust the speed of connected fans from low to high. However, you can only actually connect a total of two fans to the dial's available 3-pin connectors. As it just so happens, only two of the three preinstalled fans on the Z9-U3 case have 3-pin connections of their own; one's the case's top blue LED fan, whose light will vary in intensity when you spin up or slow down the fan itself.

Below this controller dial—and to the left of the front panel's two USB 3.0 and two USB 2.0 ports—is a simple display that lists the temperature (in Celsius) of wherever you happen to stick an accompanying thermal probe inside the case. It's a cute feature, but we would have preferred more USB 3.0 ports.

The case's three 5.25-inch bays are easy enough to work with, but they require you to bust out a screwdriver in order to mount additional components within your chassis. The case's five hard drive bays, while described by Zalman as "tool-free," are anything but. Instead of using drive rails or trays, Zalman requires you to screw four large screws into each of your hard drives, and these screws click into locking mechanisms on the bays themselves. Don't forget to use the included rubber vibration dampeners, too; without them, the drives won't really fit in the bays correctly.

The case does fit video cards up to 29 centimeters in length, but, as you might expect, it can start to feel a bit cramped on the inside. The inclusion of cutout holes on the motherboard tray for cable routing helps alleviate the problem a bit, and the large, empty hole behind the CPU section of a typical ATX or microATX motherboard makes modifying a CPU cooler a breeze. While you can even go liquid cooling if you want in this chassis—using the case's two top 12–14cm fan mounts for a two-fan radiator and the rubberized holes in the case's rear for tube routing—it's still going to feel a little tight.

The Z9-U3 both looks and feels like an inexpensive chassis—one could also use the word "cheap." The case's bonus features of a fan controller and a temperature display are fun, but we'd gladly trade these for an easier installation process, a little bit more space, or better looks. **–DAVID MURPHY**

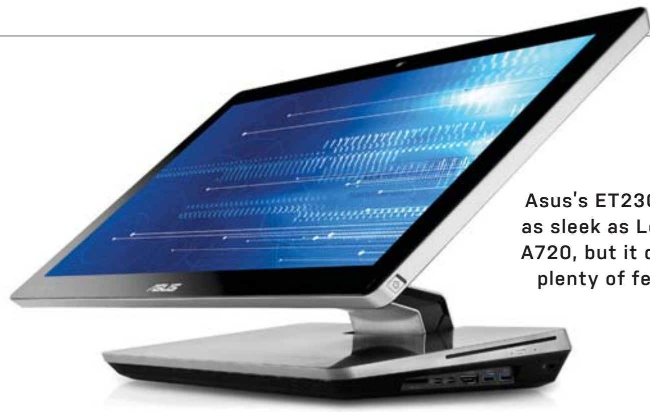
VERDICT 6

Zalman Z9-U3

SR-2 Built-in fan controller and temperature display; cable-routing holes in motherboard tray.

P90X Demands tools for awkward component installation; so-so aesthetic; can feel cramped.

$70, www.zalman.com



Asus's ET2300 isn't as sleek as Lenovo's A720, but it delivers plenty of features.

Asus ET2300 All-in-One PC

Mostly evolutionary

THE CONCEPT of the desktop PC that folds flat like a tabletop is catching on. HP was first, with its Z1 workstation, but Lenovo brought the technology to consumer all-in-ones with its very sexy IdeaCentre A720. Now Asus has adopted the idea for its new ET2300 series.

Like the A720, the E2300 tucks all its components inside the base of its display; but for whatever reason, Asus needed more room than Lenovo. The E2300's base is thin enough at the front, but it slopes up to about 1.5 inches high in the back. Lenovo's A720 is less than an inch thick all around.

Asus makes very big claims for the ET2300's audio performance, as in "the best audio experience ever in an AiO." Uh, no. Asus did go farther on this score than most manufacturers have—the ET2300 has a four-speaker array augmented by an internal subwoofer, and you can buy an optional (and proprietary) outboard subwoofer—but this all-in-one sounds only slightly better than the nails-on-a-chalkboard A720. Plan on using headphones for a personal audio experience, or external powered speakers to fill a room.

This ET2300 model that Asus sent us costs $400 less than Lenovo's A720, but its 23-inch IPS panel is much smaller than the 27-inch VA panel that Lenovo delivers (both models deliver the typical resolution of 1920x1080, and both provide 10 touch points to support Windows 8.) Although the Asus has a lesser CPU (the ET2300 ships with a 3GHz Intel Core i5-3330 desktop processor that doesn't support Hyper-Threading, compared to the A720's 2.3GHz Intel Core i7-3610QM mobile that does), the two machines traded benchmark wins. The Asus proved slightly faster on the gaming-oriented tests (3DMark 11 and Metro 2033), despite the fact that both machines are equipped with 8GB of DDR3/1600 memory and discrete graphics in the form of Nvidia's GeForce GT 630M. We surmise it's because the Asus's base clock is far higher. The Lenovo, on the other hand, delivered better performances with our Adobe Premiere and MainConcept benchmarks, thanks to its Hyper-Threading.

Aside from the size of its display and with the exception of its optical drive (Lenovo packs a slot-feed Blu-ray player/DVD burner in the A720, where Asus provides only a slot-feed DVD burner), the balance of the Asus's spec sheet is far superior. Both machines come with 1TB of storage, but the drive in the ET6300 spins its platters at 7,200rpm compared to the 5,400rpm model in the A720. And where the A720 is outfitted with two USB 2.0 ports and two USB 3.0 ports, the ET2300 ships with four USB 3.0 ports plus an eSATA/USB 2.0 combo port and two Thunderbolt ports.

Thunderbolt technology delivers bi-directional data transfer speeds up to 10Gb/s, and you can daisy-chain up to six Thunderbolt devices, including a DisplayPort monitor. While there are just a handful of storage devices currently on the market, we expect to see them proliferate over time. Ditto for Thunderbolt displays.

Like any all-in-one worthy of the name, the ET2300 has an HDMI input (to support a gaming console or set-top box); but in addition to providing HDMI out (to support a second display or a video projector), the ET2300 also supports WiDi, so that it can wirelessly mirror its audio/video output to a TV or a streaming box (such as Netgear's new Neo-TV Max) that supports that Intel technology.

The ET2300 certainly isn't a barn burner, but it is a solid all-around family PC. While we expected to see a Blu-ray drive at this price point, the presence of Thunderbolt and WiDi are welcome features. –MICHAEL BROWN

SPECIFICATIONS

	Asus ET2300	Lenovo ThinkCentre A720
Price	$1,300	$1,700
CPU	3.0GHz Intel Core i5-3330	2.3GHz Intel Core i7-3610QM
GPU	Nvidia GeForce GT 630M	Nvidia GeForce GT 630M
RAM	8GB DDR3/1600	8GB DDR3/1600
HDD	1TB (7,200rpm)	1TB (5,400rpm)
Optical	DVD burner	Blu-ray player/DVD burner
Display	23-inch LED backlit IPS LCD 1920x1080 (10-point touchscreen)	27-inch LED backlit VA LCD 1920x1080 (10-pont touchscreen)

VERDICT **8**

Asus ET2300 INTI-B022K

➕ **THUNDER** Lots of I/O ports, including two Thunderbolt ports; supports WiDi.

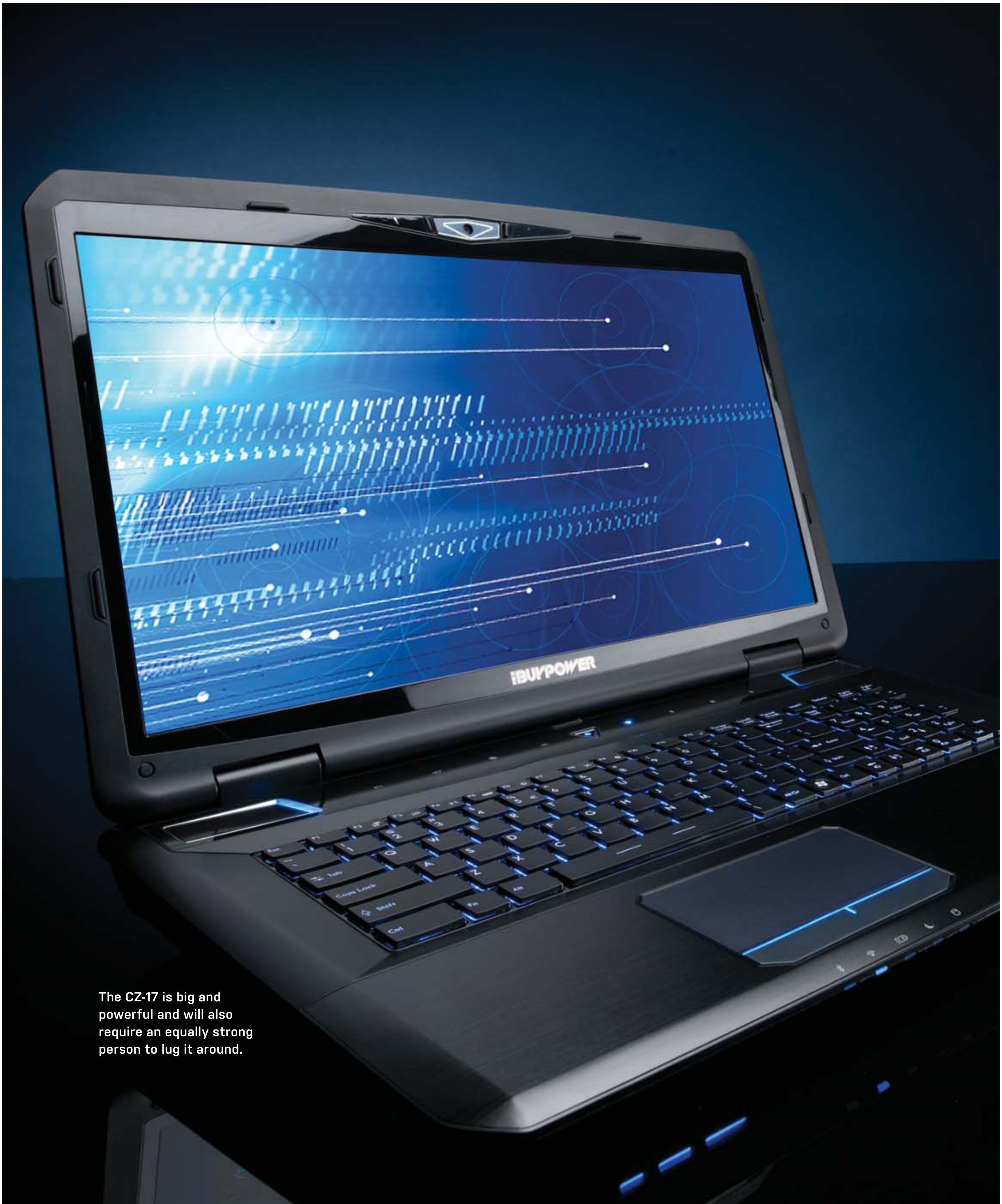
➖ **LIGHTNING** Lousy speakers; no Blu-ray drive—not even as an option.

$1,300, www.asus.com

BENCHMARKS

	Asus ET2300INTI-B022K	Lenovo ThinkCentre A720
3DMark 11	**P1,332**	P1,313
Metro 2033 (fps)	**22.1**	20.8
Adobe Premiere (sec)	470	**461**
MainConcept (sec)	1,128	**1,026**
ProShow Producer (sec)	**556**	562

Best scores are bolded.



The CZ-17 is big and powerful and will also require an equally strong person to lug it around.

iBuyPower CZ-17

The Incredible Hulk of laptops

THINK A LAPTOP is supposed to be a light and portable PC? Think again. iBuyPower's CZ-17 is neither of those things. With a carry weight of almost 11 pounds and dimensions measuring 16.9x11.3x2.2 inches, this thing is huge and friggin' heavy. Imagine lugging around a dumbbell in your pack all day and you'll catch our drift.

Aesthetically, the CZ-17 looks eerily similar to our MSI GT60 zero-point laptop (reviewed December 2012) except super-sized with a 17.3-inch display. The 1920x1080, LED-backlit monitor features a nice matte finish, which nicely diminishes glare. The TN panel exhibits a slight shimmer when viewed more than 45 degrees off-axis, but a crowd of three people won't have issues watching a movie together on it. While the CZ-17's chassis looks an awful lot like the GT60 with its edgy contours and cut-off corners, it doesn't feature the zero-point's gaudy-colored LEDs. Instead, blue is the color of choice here. Everything from the speakers and trackpad to the keyboard and various lines are laced in blue luminance. Only iBuyPower's beast logo on the top cover differs, with its red hue.

Under the bright lights and within the belly of the beast lies a 2.4GHz Intel Core i7-3630QM CPU, Nvidia GeForce GTX 680M GPU, and 16GB of RAM. In terms of storage, the CZ-17 features a 120GB SSD and a 7,200rpm 750GB hard drive. This duo allows the laptop to boot Windows 8 in 26 seconds, which is fair.

The CZ-17 traded minor blows with our GT60's slightly lower-clocked 2.3GHz Core i7-3610QM in our three CPU-intensive tests, but where it really stood out was in the graphics department. In our 3DMark 11 performance benchmark, iBuyPower's laptop performed an astonishing 95 percent better than MSI's counterpart. The gap only increased in our STALKER: CoP benchmark, where the CZ-17 simply decimated the GT60 by more than 112 percent. At first we thought we had made a testing error, thinking that a 680M couldn't be that much beefier than a 670M, but when we ran the benchmarks again, the same results came up. Playing Counter-Strike: Global Offensive and Dota 2, performance on the CZ-17 was silky-smooth, consistently staying above 60fps with everything maxed out. It just goes to show you how Nvidia's higher-end 680 GPU and refined 28nm Kepler architecture really do make a substantial difference in the graphics department.

In terms of battery life, the CZ-17 fell short of MSI's 15.6-inch laptop by almost 30 minutes, but considering the laptop has a larger screen, you can't expect the same power consumption. Regardless, in our battery rundown test, the CZ-17 lasted two hours and 40 minutes, which should be enough for most movies, provided you don't watch only Peter Jackson films.

One feature we didn't care for was the trackpad. On paper, it sounds great: multitouch with touch-to-zoom. The problem is that the touch-to-zoom is super choppy and unresponsive and if you accidentally have a second finger touching the pad, it becomes confused. Luckily, we were able to disable multitouch with a driver update given to us directly from iBuyPower. The bigger annoyance actually pertains to the buttons below the trackpad, which require a ridiculous amount of pressure to click. People with weak fingers should not apply.

Of course, this criticism may not matter because this extremely heavy laptop is clearly best used as a portable gaming desktop (i.e., with a mouse). If you were hoping to buy a light and portable gaming laptop for on-the-go play, you should definitely look elsewhere; however, if all you're looking for is something to lug in your car when you drive to the nearest LAN party, the CZ-17 is certainly a solid solution.

–**JIMMY THANG**

VERDICT 8

iBuyPower CZ-17

+ MARK RUFFALO HULK Powerful GPU; large screen.

− ERIC BANA HULK Super heavy; trackpad buttons hard to press; HDD size could be bigger.

$1,800, www.ibuypower.com

SPECIFICATIONS

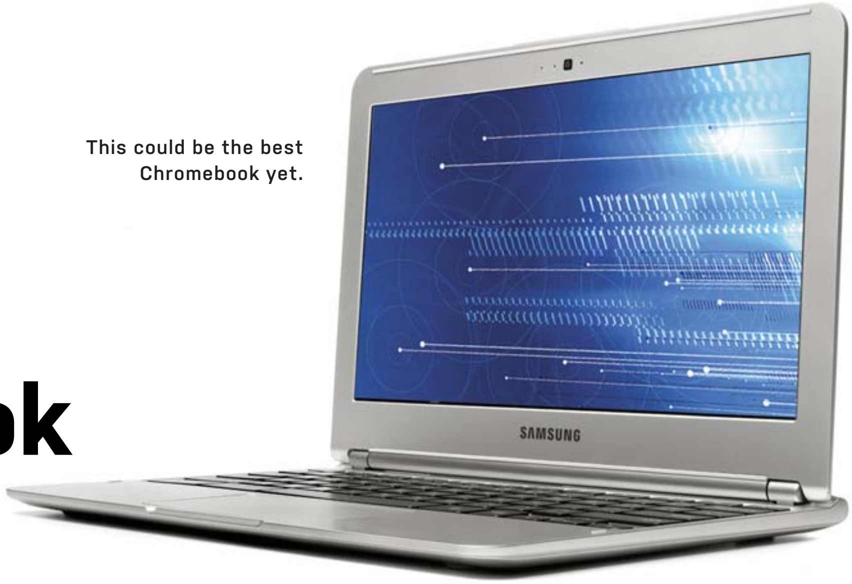
CPU	2.3GHz Intel Core i7-3630QM
RAM	16GB DDR3/1600
Chipset	Intel HM77
GPU	Nvidia GeForce GTX 680M 4GB
Display	17.3-inch, 1920x1080 LCD
Storage	120GB Intel 330 Series SSD; 750GB hard drive (7,200rpm)
Optical Drive	8x DVD+/-RW
Connectivity	Ethernet, VGA, HDMI, eSATA, 4-in-1 card reader, 3x USB 3.0, 2x USB 2.0, audio in, audio out, headphone, mic, 3MP webcam, built-in Bluetooth, 802.11b/g/n
Lap / Carry	8 lbs, 12.8 oz/ 10 lbs 15.6 oz

BENCHMARKS

	ZERO POINT	
Stitch.Efx 2.0 (sec)	1,105	1,037
ProShow Producer 5 (sec)	1,774	1,743
x264 HD 5.0	11.8	12.4 (-4.8%)
STALKER: CoP (fps)	32.9	70 (112.8%)
3DMark 11 Perf	3,003	5,873
Battery Life (min)	187	160 (-14.4%)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our zero-point notebook is an MSI GT60 with a 2.3GHz Intel Core i7-3610QM, 12GB DDR3/1600, two 500GB Seagate 7,200rpm hard drives, a GeForce GTX 670M, and Windows 8 64-bit. STALKER: CoP tested at 1920x1080 with Ultra settings, Tessellation, and contact hardening.



This could be the best Chromebook yet.

Samsung Chromebook

ARM isn't always slower than x86

IT'S HARD TO believe that the Chromebook is still with us. If you recall, Chromebooks were birthed in a tumultuous time for the world. The country was in the midst of economic collapse and craptastic netbooks were the cheap hotness.

Today, netbooks are so worthless that some companies have resorted to giving them away with the purchase of an Ultrabook. Yet Google's Chromebook science experiment is still kicking along. As they were at inception, Chromebooks remain low-end hardware coupled with an OS built almost entirely around the Chrome browser and are really best suited for those who live the Google lifestyle.

The latest iteration is the Samsung Chromebook Model No. XE303C12. It's actually the third Samsung Chromebook. We reviewed the company's first effort, the Chromebook Series 5 (September 2011), which sported a dual-core 1.66GHz Atom N5770, and found it wanting. Though not entirely the fault of the weak Atom chip, the Chrome OS was simply too limited in offline functionality, and even many online functions didn't quite work right when it was connected.

Samsung's latest Chromebook is markedly different from the Series 5. The most noticeable change is the use of Samsung's own 1.7GHz Exynos 5 CPU. This SoC CPU is based on the Cortex A15 and is an out-of-order design rather than the typical ARM design, which uses the slower-but-power-sipping in-order execution. To see how this ARM chip stacks up, we compared it to the Series 5 using the Atom N570 as well as the original Google CR-48 concept Chromebook running an Atom N455. The winner? Surprise, x86! The Samsung ARM chip slaps around both Atom CPUs like the Hulk smashing bad guys. Before ARM aficionados declare complete victory, we will note that we suspect the pricier Celeron-based Chromebook would eat the Exynos in one bite. Celeron-based Chromebooks are hardly cheap, though. Of course, the real problem is that discussing performance on a Chromebook is mostly academic—you don't need much power to run a browser. Even the ancient single-core CR-48 is still quite usable.

It's more about the presentation and the pricing. In presentation, Samsung does a relatively good job, though the easily scratched plastic shell doesn't exude quality. The new Chromebook is Ultrabook-thin, weighs 2.5 pounds, and its 11.6-inch screen sports 1366x768 resolution—which is slightly higher than the Series 5 Chromebook. The big breakthrough for the Chromebook is its price. At $250, the Chromebook is almost a compelling mobile device.

We say almost because no matter what, Chromebooks will always be limited compared to a PC or even a tablet. While the much lower price of the new Chromebook makes it pretty attractive, tablets and even convertible PC's have been moving in price, too. Now that a quad-core tablet or a full-blown Windows 8 tablet can be had for $200–$500, the Chromebook is still only suited for those who can work around its limitation of requiring the Internet for full productivity. –GORDON MAH UNG

BENCHMARKS

	Samsung Chromebook	Samsung Series 5	Google CR-48
CPU	Dual-core 1.7GHz Samsung Exynos 5	Dual-core 1.66GHz Intel Atom N570	Single-core 1.66GHz Intel Atom N455
GPU	Samsung Mali-T604	Intel GMA3150	Intel GMA3150
SunSpider JavaScript 0.9.1 (sec)	**710**	1,380	1,296
Google Octane V1	**3,359**	2,026	1,959
Futuremark Peacekeeper	**1,150**	595	566
BrowserMark	**239,142**	142,348	131,490
WebGL Solar System Planets (fps)	**28**	2	1
Microsoft Fishbowl HTML5 10 Fish (fps)	**7**	6	5

Best scores are bolded.

VERDICT 7

Samsung Chromebook

+ CHROME Thin; light; cheap.

– TIN Offline support still fairly limited.

$250, www.samsung.com



The Node lets you carry all the video and photos you need—if you have the drive for it.

Patriot Gauntlet Node

BYO media streamer

IF JERRY SEINFIELD worked at *Maximum PC* reviewing overpriced gadgets, we're pretty sure he'd be saying: "And what's the deal with getting charged so much for so little RAM? You know, the 16GB version of the HTC Galaxy 5 costs $199 but the 32GB costs $299? And, what? No expansion slot for additional RAM?"

Well, Jerry, consider Patriot's Gauntlet Node, a Wi-Fi media streamer–cum–hard drive. Patriot's Node doesn't break new ground. Plenty of mass-storage-based Wi-Fi products have been on the market. One we were particular smitten with was Kingston's 64GB Wi-Drive that offers similar functionality. But while we liked the Wi-Drive's svelte size, a $115-ish street price is a lot cash for just 64GB of storage.

Patriot's approach is to decouple storage from the device. So what you get is the equivalent of your typical 2.5-inch hard drive enclosure with integrated Wi-Fi and NAS support. More on this later. Inside the Node you can install most any laptop hard drive. We installed a 9.5mm 500GB drive easily; it's possible a bigger drive could fit but we didn't have one to try out. Patriot says a 2TB drive will fit, but considering that notebook drives that big are 15mm in height, it would be tight. You can easily find 1TB drives online for under $90, though, and those are 9.5mm.

The device has two ports: a USB 3.0 Micro USB port and a power port. The device ships with a typical 2-amp USB charger but it connects to a standard round plug rather than charging through the device's USB port. Why? Kramer!

Copying your files to the drive is a snap. Just plug it into an available USB 2.0 or USB 3.0 port and copy your movies, images, music, and documents to it at will. What's really nice is the speed. Our main complaint about Kingston's Wi-Drive was write speed—it was pretty damned slow. With the Patriot Node, you're writing at the limit of the HDD you have in it.

To access the files, you install a free app from your portable device's app market and browse the contents of the drive. We used an Android phone with 2.3 "Gingerbread" loaded on it and had no issues playing numerous video files. Android lets you pick your video player of choice, so you may have to install an additional player if the vid you're trying to watch is in a funky format. Perhaps even niftier, the Patriot Node not only lets you read files over Wi-Fi, but write them as well, so if you want to back up your docs file, it's a snap. It would be nice if Patriot had a specific backup app that would let you automate the process.

What we're not fans of, however, is the lack of default encryption on the Wi-Fi. You can select from WEP to WPA and WPA2. Anyone with the app on their phone, or a laptop connecting to the default IP address of the device, could start slurping content from your drive—or uploading files to it without you knowing, or hijack the device, since the user account of admin has a password of "admin." Not good.

Our other complaint is the build quality. The device is made of plastic and feels like it wouldn't survive a fall to the floor. The battery life on the device is so-so, as well. With its 3,350mAh Li-Ion battery, we saw just under four hours of video playback before it went dry. That's not bad, but not great. Considering that the battery has to keep the drive spun up while serving video, it's probably acceptable.

Basically, there's a lot right with the Patriot Node and a few things wrong. Given the Node's ability to provide a never-ending supply of digital content for your mobile devices, and the speed at which you can load it on there, we think the good wins out. –GORDON MAH UNG

VERDICT **8**

Patriot Gauntlet Node

+ **PIE À LA MODE** Refreshingly fast write speeds; can write to device from your phone.

− **COMMODE** Needs security on by default; plastic construction.

$99, www.patriotmemory.com

The Water2.0 Pro comes with two 12cm fans for a push-pull configuration.



Thermaltake Water2.0 Pro

The LL Cool J of water coolers: cool, but loud

WATER COOLING is the way to go if you're serious about keeping your CPU thermals in check, and the easiest way to dip your toe in the water-cooling pool is an all-in-one unit that bolts onto your case. You don't have to mess with pumps, tubing, or fans, and the kits will work with any modern CPU and most chassis, so their appeal is maximum cooling with minimum effort. Thermaltake is on board with this concept, and offers three tasty all-in-one entrées in its Water2.0 series: a low-end "Performance" model, a double-rad "Extreme" model, and the midrange "Pro" version we examined this month.

The cooler is an Asetek design that's prefilled with coolant and features a fat 48mm radiator sandwiched between dual 12cm fans. Thick rubber tubes shuttle the coolant back and forth between the radiator and the cooling block, which features a copper contact plate to maximize heat transfer.

Putting it all together wasn't too difficult, but the installation process included one semi-major annoyance, which we'll get to later. For our thermal test, we didn't need to install a backplate on our LGA2011 test machine—of course, owners of AMD or other Intel sockets will need to do so. With our retention plate already in place, we only had to secure four screws to the cooler's retention ring. The problem is, the LGA2011 uses special screws that look nearly identical to the other screws in the kit (LGA1155, etc.), which was confusing—they should be more clearly labeled, both in real life and in the manual. Color coding, perhaps? With the retention ring in place, the next step was to drop the water block down onto our CPU and snap the two together with a retention clip. From there, finishing the install was as easy as tightening four screws. Installing the radiator was also easy, and involved using the four pairs of provided screws to sandwich the radiator between the fans and attach them to the case. Both fans connect to a Y-shaped PWM power cable, allowing them to run synchronously from a single 4-pin connector.

In testing, the cooler performed surprisingly well when we let it run at full-speed (fan control disabled), outperforming our Hyper 212 Evo zero-point air-cooler by an impressive 5 C, but it was about 3 C warmer than the similarly constructed Corsair H80 kit. In quiet mode, using PWM fan control, its performance was also impressive, but again it was not as capable as Corsair's offering.

While the Water2.0's performance is cool, its acoustics aren't. In quiet mode it emitted a high-pitched humming noise, even at idle, and under load the hum became more pronounced. The humming sound went away when we ran the fans at full speed, but then the fan noise was so loud as to resemble a small wind tunnel inside our chassis.

Overall, the Water2.0 Pro definitely runs cool, but at the cost of excessive noise in either of its modes. Considering the similarly priced H80 runs a bit cooler, we'd give the nod to Corsair's solution for a 12cm-based all-in-one water cooler.
–JIMMY THANG

VERDICT 8

Thermaltake Water2.0 Pro

+ JOSEPH GORDON-LEVITT Great cooling performance.

− JOSEPH PESCI Loud; a bit pricey.

$100, www.thermaltake.com

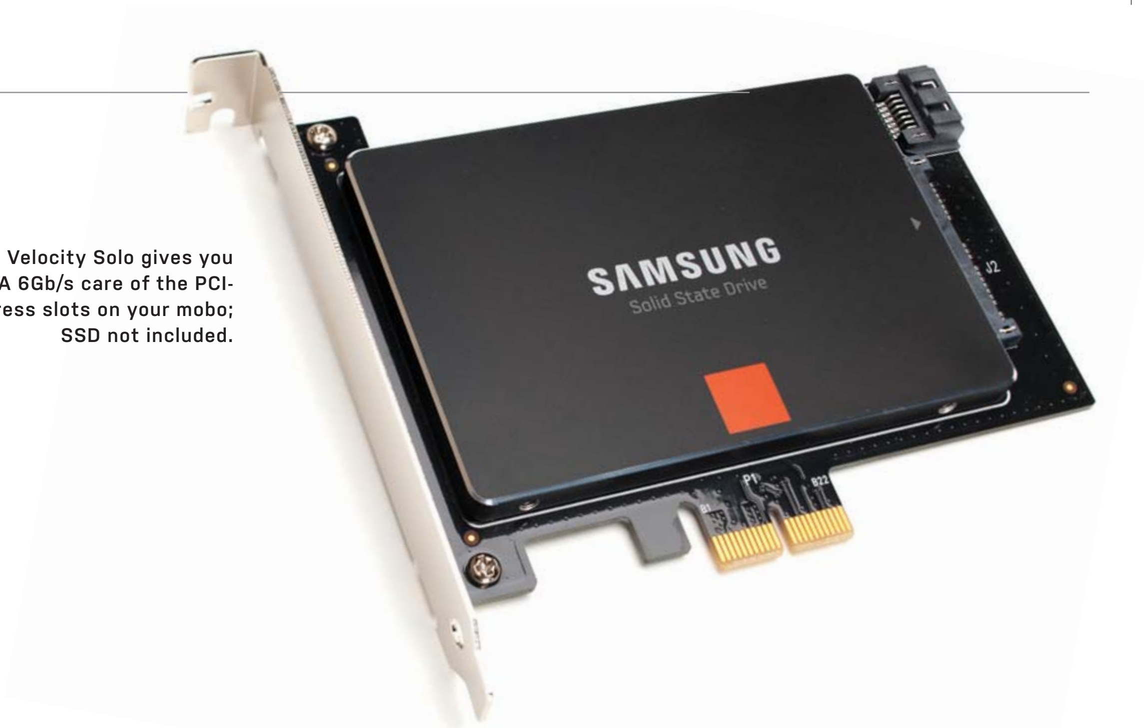
BENCHMARKS

	Thermaltake Water2.0 Pro (Performance mode)	Thermaltake Water2.0 Pro (Quiet mode)	CM Hyper 212 EVO	Corsair H80
Ambient Air	21.2	21.9	23.8	23.2
Idle Temperature	32.2	35	36.2	34.9
Burn Temperature	66.6	70.5	74	**65.3**
Burn - Ambient	45.4	48.6	50.2	**42.1**

All temperatures in degrees Celsius. Best scores bolded. All tests performed using an Intel Core i7-3960 at 4.2GHz, on an Asus P9X79 Deluxe motherboard with 16GB DDR3/1600, in a Thermaltake Level 10 GT with stock fans set to High.

SPECIFICATIONS

Radiator Dimensions (H x D x W)	5.9 x 4.7 x 1.9 inches
Weight	2.3 lbs
Stock Fans	2x 12cm PWM
Socket Support	LGA775/1155/1156/1366/2011; AM2/AM2+/AM3/AM3+/FM1
Additional Fan Support	N/A



The Velocity Solo gives you SATA 6Gb/s care of the PCI-Express slots on your mobo; SSD not included.

Apricorn Velocity Solo X2 PCIe SSD Adapter

The poor nerd's RevoDrive

THE APRICORN Velocity Solo X2 is designed to do one thing and one thing only: let you upgrade your boot drive to a SATA 6Gb/s SSD on a system that doesn't have any of them newfangled ports. Living in a world filled with PCs that could be used in the space program, it's not a problem we encounter very often, but we can certainly understand its utility where an older motherboard is involved.

You will need an empty x2 (or larger) PCIe slot to use it, however, but if you have one available and you're not ready to upgrade you're motherboard, the Velocity X2 is a great solution that offers impressive performance and an easy setup.

To use the Velocity Solo X2, simply attach the SSD to the card itself using the provided screws. There's a second SATA 6Gb/s port on the card that can also be plumbed to another drive—and no, you can't run the device in RAID. With the card in your PCIe slot, you can boot the system and the drive appears; it's as simple as that. The board uses Marvell's newer 88SE9182 controller, an improvement over the Marvell 88SE9128 controller found in many older motherboards.

Once we had the drive connected, we decided to see how much performance—if any—we'd lose by ditching our native Intel SATA 6Gb/s ports for the Velocity Solo X2. As a x2 PCIe 2.0-compliant device, you're looking at a maximum theoretical bandwidth of about 1,000MB/s. For our testing, we reached for the fastest SSD we had on hand—the Samsung 840 Pro. Not surprisingly, the drive was able to completely saturate the SATA 6Gb/s interface's limit.

In CrystalDiskMark's sequential read and write tests, we saw speeds of 488MB/s and 474MB, respectively. That's only about 20MB/s slower than what we achieved with the native Intel ports, which is excellent. In our compressible data test in ATTO, with a 64KB write and a four-request queue, the drive ran right up to the maximum throughput, pegging the needle with 500MB/s write speeds and 484MB/s read speeds. In our "real-world" PCMark Vantage test, we saw almost zero change from what we experienced with the Samsung drive running naked on a SATA 6Gb/s port: On the Velocity board the Samsung scored 55,272, while it racked up a score of 56,608 on an Intel port.

The one area where we saw a small loss of performance was in heavily queued workloads. In our Iometer test, which hits the drive with a queue of 32 4K write requests at once until the drive cries uncle, we saw performance drop by about 20,000 IOPS. This is a test we run for people considering a certain drive for use in a web or file server, as home users will rarely develop a 32-request queue on their desktop, but the performance drop is notable.

The final piece of the puzzle is the included EZ Gig IV drive-cloning software, which let us easily clone our boot drive to the Samsung SSD in just a few minutes and boot from it. It didn't like our USB key for some reason, but worked splendidly from a CD-R.

All in all, we give the Velocity two thumbs up for being easy to use and offering impressive speed. We also like the second SATA port and drive-cloning software, but we're taking off a few points because $100 is a bit pricey. –JOSH NOREM

VERDICT 8

Apricorn Velocity Solo X2 PCIe SSD Adapter

+ **LIGER** Easy to install; smokin' speeds; dual SATA ports.

− **SLOTHEPHANT** Performance loss in 32QD workloads; a little pricey.

$100, www.apricorn.com



Defensive moves are just as important to master as offensive skills, and are critical to staying alive.

Dishonored

It was an honor

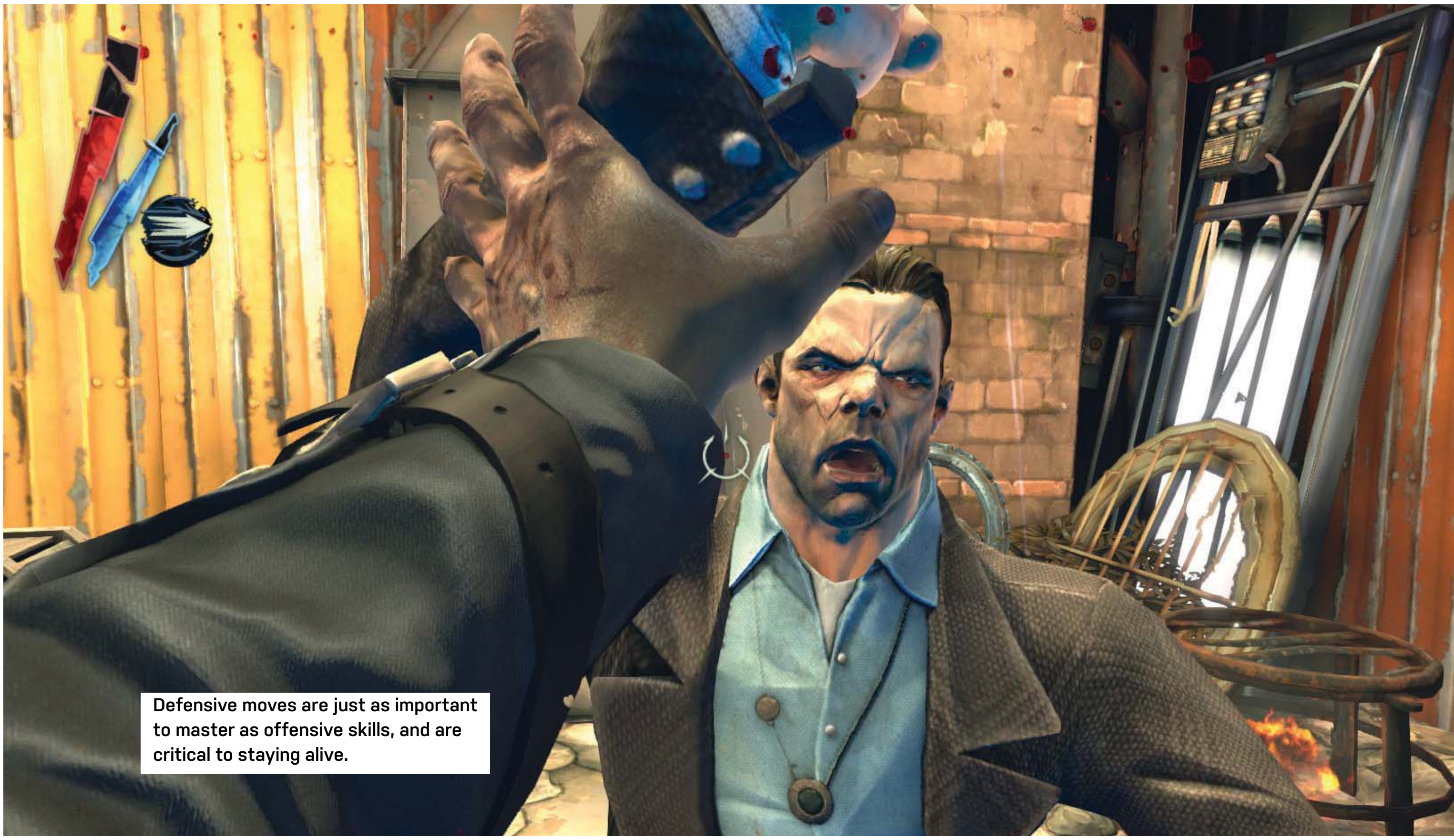
DISHONORED IS A refreshingly stealthy change of pace in a first-person-shooter market crowded with Call of Battlefield–type games that seem like they were produced by Michael Bay. Don't get us wrong—we love blowing stuff up, and we love killing terrorists, but sometimes we like to take a break from the frantic action and unwind with a night of stealthy throat slitting and neck snapping. After all, a man's got to relax. This is what Dishonored delivers; a game based on stealth, tactics, and the delightful task of mastering a broad range of mystical abilities, providing us with a much-needed change of scenery in an FPS landscape dominated by desert warfare shooters, Borderlands 2 notwithstanding.

In Dishonored, you play as security-guard-turned-assassin Corvo Attano. You've been framed for murdering the Queen, causing you to set out to recapture your good name and rid the city of the corrupt people conspiring against you. The game's structure is similar to Deus Ex: Human Revolution in that you hang out in a hub city where you can buy gear, have weapons made, and receive missions from locals. When you're ready to embark on a mission, you simply head to the waterfront to be transported to the next mission area. We like that the game gives you the freedom to either chill or kill at your leisure, and it's fun to return from a mission and prepare your loadout for the next one, as well.

The main missions are mostly assassination jobs where you're given details about a human target and allowed to decide how to handle it once you arrive at the kill zone. You can either go in guns- or knives-blazing, or if you're in a forgiving mood, you can go nonlethal by knocking the enemies unconscious through various means. On our first play-through we opted for killing everyone in sight (we were having a bad day), and the result was both gory and gratifying. We particularly enjoyed slashing enemies' jugular veins, which would unleash a torrent of blood from their necks. Even though the killing was almost nonstop, it never got old, as the game features several-dozen death animations and each one is interesting and unique. When we were fighting a barrage of enemies, we had to combine abilities, such as summoning rats to nibble at our foes while slowing time so that we could kill our enemies while they were preoccupied with the varmints.

On our second play-through we tried to not kill anyone, and the game changed dramatically. The stealth approach forced us to be much more creative in how we approached situations, relying more on magic skills and other abilities instead of blunt-force trauma. The Dark Vision ability is useful for sneaking around, since it lets you see through walls. It's especially handy for mapping out paths that evade guards.

The game's primary ability is called Blink and we used it generously when being stealthy, as it let us run with super-



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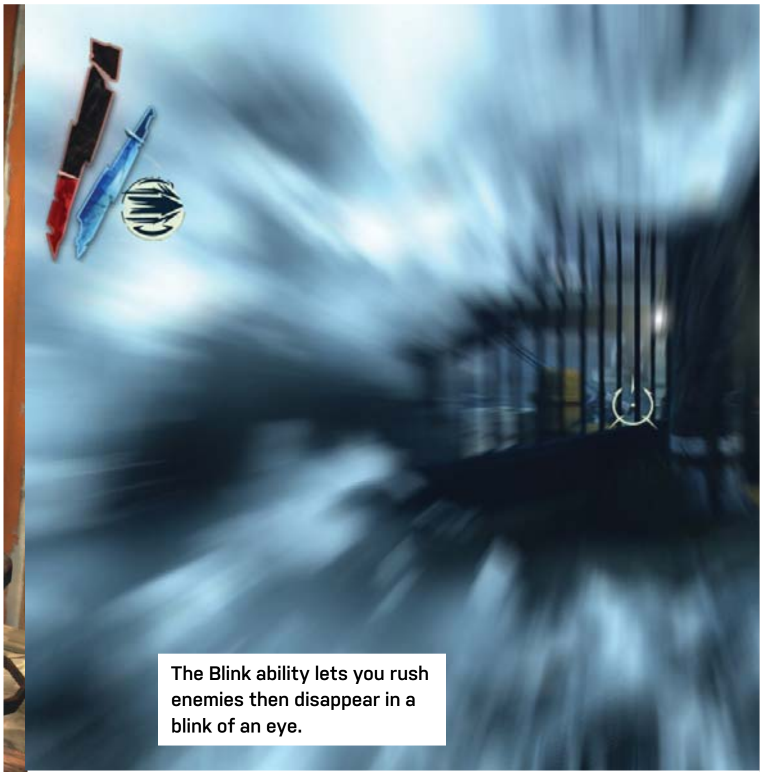
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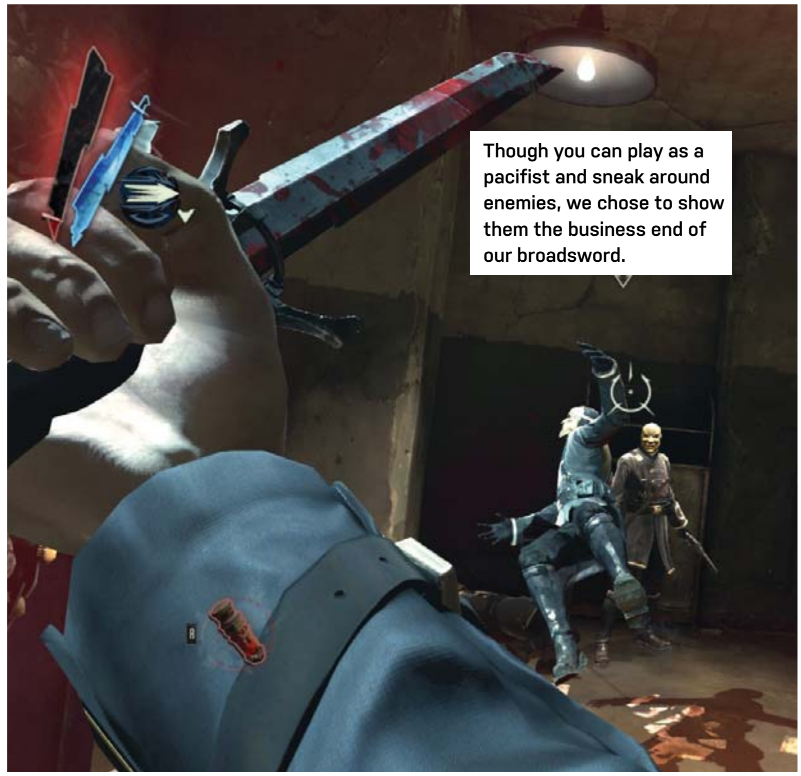
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The Blink ability lets you rush enemies then disappear in a blink of an eye.



Though you can play as a pacifist and sneak around enemies, we chose to show them the business end of our broadsword.

speed in and out of cover undetected, and scale rooftops effortlessly, too.

Dispatching foes is accomplished via a variety of interesting weapons designed to work either at close or long range; you can hold two weapons at once and use each according to how you'd like to play the game. The default melee weapon is a sword, but you can choose between two different ranged weapons, including a wooden flintlock pistol or a crossbow that supports several different arrows. We weren't fans of the pistol; it would wake up the neighborhood and using it always brought a flood of angry guards directly to our location. We much preferred the crossbow, as it's quieter and can handle three different types of darts: regular, sleeping, and incendiary. This helped us kill people quickly and quietly at range while remaining hidden in the shadows.

Over time, you can upgrade skills by finding hidden runes and applying them to specific skill trees like in an RPG. The runes are located all over the city; to find them you use a beating heart that you hold in your hand, which is always a cool thing to hold. Foraging around the city looking for runes helped to mix up the gameplay and we enjoyed the change of pace it provided.

The game took us roughly 12 hours to complete the first time, and that was with all of the five side missions completed. The optional quests enhance the main story and also pay off pretty well in loot.

The campaign is short, but Dishonored includes two different endings that correspond to how many people you killed or didn't kill during the game, so most people will want to play through the game twice. As you progress through the game, you are given an overall chaos score that lets you know if you're on track for a low-chaos ending or the high-chaos ending, allowing you to adjust your tactics along the way to fulfill your goals.

Dishonored's Unreal-based graphics look superb, with running waterways and dark, moody environments. We played it on an Intel Core i7-2700K processor overclocked to 4.43GHz with an Nvidia GTX 660 Ti video card and all settings maxed out at 1080p, and the game played flawlessly. One of the drawbacks to its silky-smooth frame rate is the presence of somewhat low-res textures, but it's a trade-off we're OK with.

We had been looking forward to Dishonored for a while since it promised a mixture of gameplay elements pulled from several games we've loved: Thief, BioShock, and Deus Ex. Now that we've slashed our way through it a few times, we're happy to report that it more than met our lofty expectations, and was enjoyable both times we played it through. Whether we were pulling the old smash-and-grab or skulking around and snapping necks, it was a blast, and the variety of the gameplay was a welcome addition to our gaming stable. We've gotten so used to games where the sole objective is to kill everyone in sight that having our objective be to *not* kill was refreshing. And of course, if we snapped, we liked having the option to go on a bloody rampage mid-mission, as well. Variety truly is the spice of life. –**CHRIS ZELE**

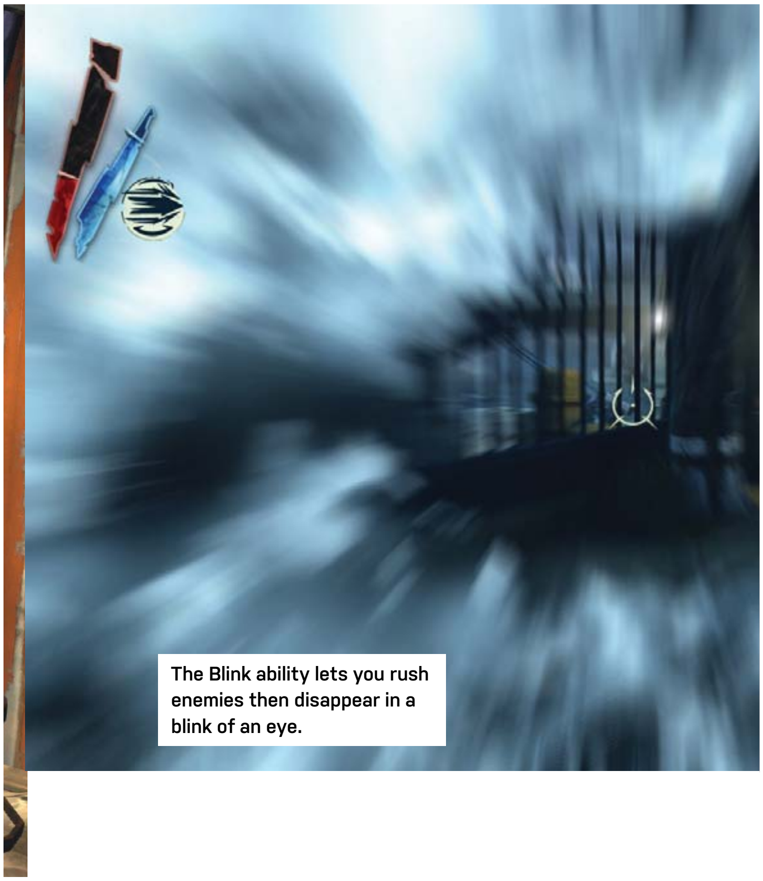
VERDICT **9** KICK ASS!

Dishonored

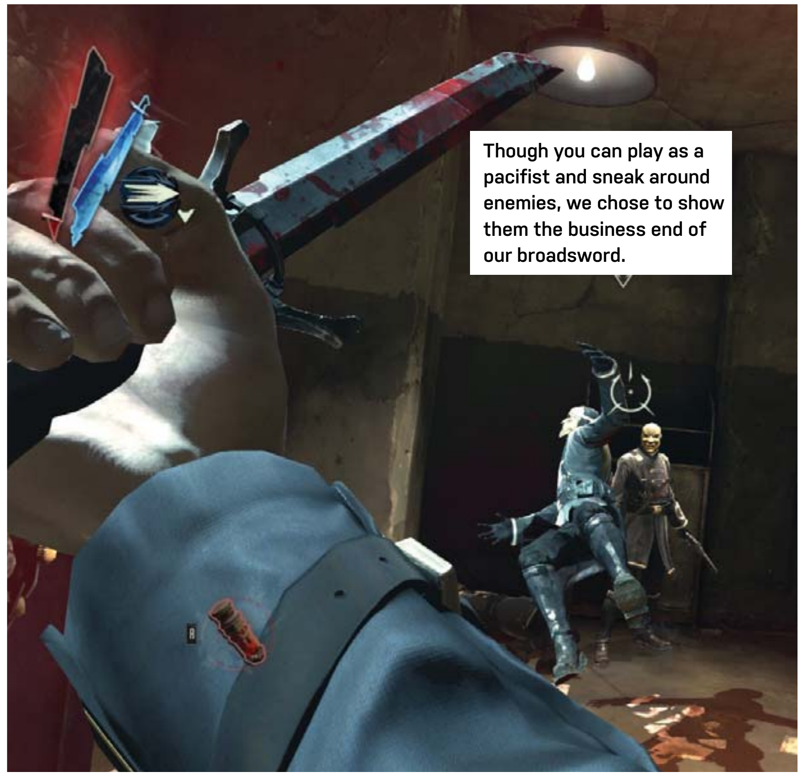
+ DEUS EX: HUMAN REVOLUTION Open-world gameplay; wide array of awesome abilities; two different endings.

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$60, www.dishonored.com, ESRB: M



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LAB NOTES

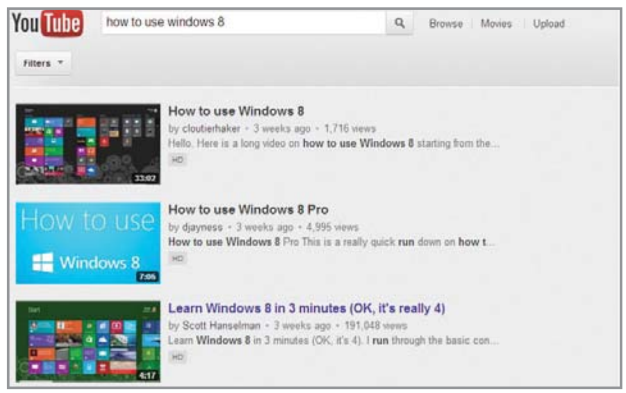
KATHERINE STEVENSON **EDITOR-IN-CHIEF**



Getting in Touch with Windows 8

Although, Microsoft hasn't made it easy

LAST MONTH in this section I said I would report back on whether a touch-enabled laptop is a good idea. Having spent the last few weeks using three different laptops with touchscreens, I can say that it makes a lot of sense with Windows 8. I found myself naturally using touch gestures to get around the Modern UI and a mouse and keyboard in the desktop mode. And it didn't seem weird at all to be using alternate behaviors. What did seem weird to me was how little effort Microsoft put into orienting people to the new UI. There's the briefest of examples when you first install Windows 8, showing you how to access the Charms bar. Why wouldn't MS provide a thorough tour of the OS? It would greatly improve the initial user experience. Luckily, others have answered that obvious need with YouTube videos, such as "Learn Windows 8 in 3 Minutes" (bit.ly/TOGujQ).





Jimmy Thang
Online Managing Editor

I recently cracked and got a smartphone. That might sound crazy coming from a *Maximum PC* editor, but I always figured I'm in front of the computer all day, I don't need to bring a computer with me when I'm out on a beautiful hike. Plus, I've had a sneaking suspicion that smartphones can make people dumb. And I are not dumb!



Josh Norem
Senior Editor

This month I switched my SSD test bed over from a P67-based rig to a Z77 machine running an Asus P8Z77-V Premium mobo just because performance was much more consistent. I also discovered that performing a secure erase on an SSD is not something one should undertake if they are trying to keep their blood pressure down.



Gordon Mah Ung
Deputy Editor

I'd be more inclined to upgrade my PC a lot sooner if I could just virtually "box up" my primary system at home with its six drives and store the image on a single 3TB drive and "boot it." This would let me recycle the old box without the fear of losing access to data or a program I had installed.



Chris Zele
Intern

Another COD has been released and I hope it's not just another reskinning of COD 4. Activision has been on a mission to release a COD game every year, and has destroyed the brand with its nonstop yearly releases. The last few games didn't do anything special for me and the multiplayer always seems rehashed. I hope this one's finally the breath of fresh air that I want.

LETTERS

WE TACKLE TOUGH READER QUESTIONS ON...

> Death of Ethernet
> Azza Genesis 9000
> Apple Complimented

The Death of Ethernet

Has the writer of The List in the December 2012 issue ["Nine Dead and Dying Technologies"], lost their mind? Ethernet dead or even dying? Ethernet transfer speeds are much higher than even dual-channel 802.11n, which is the fastest standard at this time. Has the writer tried streaming 1080p video or playing a first-person shooter over Wi-Fi? How about both at the same time? What if you want to watch a movie and someone else wants to play Halo or Counter-Strike at the same time? Can you do that with Wi-Fi? No, you cannot (well you could, but both would suck... *hard*!). How about your entire family (say, three PCs, a PS3, and a streaming box) all doing different things at the same time? Not a problem with Ethernet, but it's not gonna happen with Wi-Fi. Current Wi-Fi is woefully slow, with tons of lag unless you are in a perfect-line-of-sight world with zero radio frequency interference and only one user at a time. I think the death of Ethernet is still a long, long time in the future.

I'd also like to add that the optical drive and the keyboard/mouse combo are going nowhere until something that actually works and is practical comes along to replace them.

—Daivd H.

DEPUTY EDITOR GORDON MAH UNG RESPONDS: I haven't lost what little mind I have left (I have two kids, so gimme a break) but I am saddened, very saddened that Ethernet speeds have been stuck in the mud for years. How long have we had GigE? Maybe 13 years? In that time it hasn't moved a megabit forward. Wireless, however, has gone from 2Mb/s to 11Mb/s to 54Mb/s to 100Mb/s. With 802.11ac, they're promising Gigabit speeds. I usually take the speeds a wireless tech promises and divide by four to get the actual speeds I'll see, but my point is that in all that time Wi-Fi has continued to innovate and push the speed envelope. I predicted that 10GigE would be standard on the desktop two years ago, but instead I was left waving my Cat6 cable in the wind.

I want 10GigE hardwired but it seems the PC industry is only intent on giving us faster wireless speeds. Meanwhile, the tech civvies pull out their new laptops or all-in-ones, set up the Wi-Fi connection, and never pull the Ethernet cable out of the box. Where do you think this all ends up?

Azza Genesis 9000

I received the December issue of *Maximum PC* yesterday, and the first thing I noticed on the contents page was the Azza Genesis 9000. Since the black version of this case is on my wish list, it obviously caught my attention immediately.

Your review was nearly spot-on, echoing pretty much everything I've already seen or read (which is everything that put this case in such esteem in my eyes), but I did notice that you left out one essential feature: The motherboard tray can be removed and flipped 180 degrees, allowing builders to orient their system in "standard" (non-inverted) ATX position. Personally, the fact that this case is capable of inverted-ATX is one of the deciding factors for me, but there are many reasons a person may want or need to build in standard orientation, including placement (if the right panel can't be displayed, there's not much sense building to that side), design limitations (cable routing, liquid cooling, etc.), or simply the inability to recognize a superior heat-management design, and I'd hate to see potential buyers deterred because they mistakenly believe that they're locked into the inverted-ATX orientation with this case.

—Michael Schwobe

CONTRIBUTING WRITER DAVID MURPHY RESPONDS: That's completely correct: You can spin the case's motherboard tray around to give your CPU or GPU cooling a bit of a boost, thanks to the proximity of the case's delicious 23cm exhaust fans up top. The process of doing so is a wee pain in the butt, and I'm honestly not convinced that most builders are going to need to go topsy-turvy anyway. Azzatek's default upside-down installation gives your videocard(s) the

submit your questions to: comments@maximumpc.com

> “MY ISSUE IS WITH BIASED REPORTS AND CLEAR FANBOYISM IN FAVOR OF ONE COMPANY

cooling boost, and that's where I'd probably want to keep the air flowing. Just think about the heat at which your poor card(s) will run while you shoot knees in Skyrim, for example, versus your CPU.

In other words, the feature wasn't overlooked accidentally; it's just not a make-or-break feature, I feel.

Take Your Own Damned Medicine

Gordon's editorial in the November 2012 issue makes complete sense. We shouldn't be bashing a product/company just because you want to bash it. Gordon should take his own advice when it comes to Apple. Whether we like it or not, it's been the biggest tech headline for almost a decade. Yet getting Gordon to even say one compliment about Apple (especially in your podcasts) is like pulling teeth!

—**Mike**

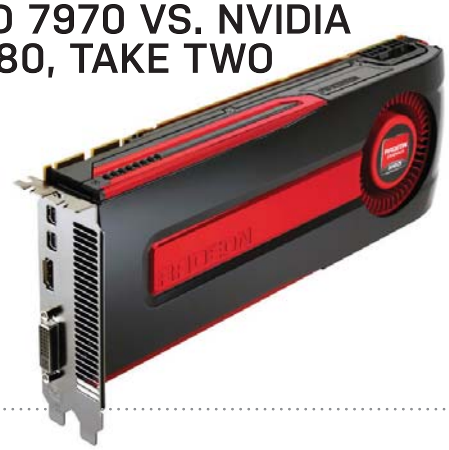
DEPUTY EDITOR GORDON MAH UNG RESPONDS: I have said plenty of complimentary things about Apple and its products. I reviewed three notebooks several years ago and the winner was… the Mac Book Pro. In an interview with *Mac|Life* magazine about the newly announced iPad, which some people were pooh-poohing as nothing but a big iPhone, I said the iPad was a very smart move by leveraging the iPhone's huge app support and would be a success. I have also heartily defended Apple when it's been wronged, and in one podcast, I defended Steve Jobs who was taking criticism because he responded gruffly to a college student's email asking him to essentially do her homework. Mr. Jobs basically said that's not my job. The mainstream tech media decided to lambaste him for not being nicer, whereas I think he should have used far saltier language in his email to her. Finally, in one example even closer to home, an editor at our sister publication *Mac|Life* collapsed and stopped breathing. I administered mouth-to-mouth resuscitation and she survived. That just goes to show you we ain't all anti-Mac over here.

My issue is with biased reports and clear fanboyism on display in favor of one company, and these days, Apple receives more than its fair share of it. Also, I appreciate your feedback and am working hard to make your customer experience even better. ⏻

[NOW ONLINE]

AMD RADEON HD 7970 VS. NVIDIA GEFORCE GTX 680, TAKE TWO

The video card wars just got more cutthroat, as AMD's new 12.11 catalyst driver adds some serious performance gains. See the red team's revitalized Radeon HD 7970 trade blows with Nvidia's flagship GeForce GTX 680 in round two of our performance benchmarks. bit.ly/VAqTdo



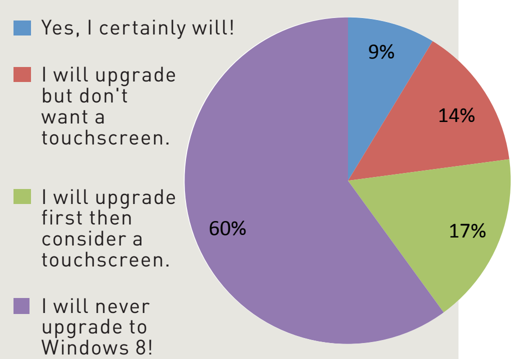
Facebook Polls

What Do You Name Your PC in Windows?

Given the, uh, creative nature of our Facebook fans, we asked them what they name their Windows install. The answers didn't disappoint.

John Orleans: Dat Ass (so he can back Dat Ass up)
Kevin Matreci: FBI Surveillance (to freak out the neighbors)
Luis Solano: Soundwave and Laserbeak
Nathan Vanderburg: Headache III
Miguel Lopes: Saturn, Cassini, Gemini, Challenger
John Pope: The Beast
Ryan Stephenson: Hentai Haven
James Ortega: Enterprise, Yamoto, Defiant, Valiant
Rick Holman: Titan, Zeus, Poseidon
David Bogle: Wolverine, DarkKnight, Doomsday
Alex Burns: Colossus (desktop), Guardian (laptop)
Jared MacKenzie: Mana, Gaia, Chaos
Blaine Andersen: Grendel and Beowulf
Timothy Twitty: Icarus, Kilowatt, Decibel
Derek Hoffman: Macbook

Will You Purchase a Touchscreen LCD When/If You Upgrade to Windows 8?



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THE BUILDS

BASELINE



INGREDIENTS

PART		URL
Case	Fractal Design Define R4	www.fractal-design.com
PSU	Corsair HX650	www.corsair.com
Mobo	Asus P8Z77-V	www.asus.com
CPU	Intel Core i5-3570K	www.intel.com
Cooler	Cooler Master Hyper 212 Evo	www.coolermaster.com
GPU	Asus GTX 660 DirectCU II	www.asus.com
RAM	8GB Patriot Gamer DDR3/1600	www.patriotmemory.com
Optical Drive	Samsung SH-222BB	www.samsung.com
SSD	128GB Samsung 830 Series	www.samsung.com
Hard Drive	1TB Seagate Barracuda	www.seagate.com
OS	Windows 7 Home Premium 64-bit	www.microsoft.com

Approximate Price: $1,148

PRICES, surprisingly, went up this month, so we had to downgrade some components to make ends meet, and the result was a net drop of about $200 for this build. We started with the Gigabyte ZX77X-UP5TH mobo, which had gone up $50, so it was traded for an Asus P8Z77-V, which is the best Z77 board for $190, hands down. We also downgraded slightly from a GTX 660 Ti to a standard GTX 660 DirectCU II from Asus since it's totally decent for 1080p gaming and saves us $70. Finally, we went from 3TB of secondary storage to 1TB, as that saved us another $100.

PERFORMANCE



INGREDIENTS

PART		URL
Case	NZXT Phantom 410	www.nzxt.com
PSU	Corsair HX750	www.corsair.com
Mobo	Asus Sabertooth X79	www.asus.com
CPU	Intel i7-3820 @4.7GHz (overclocked)	www.intel.com
Cooler	NZXT Havik 140	wwww.nzxt.com
GPU	MSI GeForce GTX 670	www.msi.com
RAM	16GB Corsair Vengeance DDR3/1600	www.corsair.com
Optical Drive	LG WH12LS39 BD-R burner	www.lg.com
Solid-State Drive	256GB Samsung 840 Series	www.samsung.com
Hard Drive	Seagate Barracuda 3TB	www.seagate.com
OS	Windows 7 Professional 64-bit	www.microsoft.com

Approximate Price: $1,831

THIS MONTH, we stared long and hard at the parts in our Performance build, and after much price-checking and internal discussion, we couldn't bring ourselves to swap any of the components, as they are the best parts available if you have a realistic budget. Since there haven't been any big changes in the CPU/mobo/RAM world lately, we examined storage and cooling and found our choices solid. We still love the Havik 140 for air cooling, and the Samsung 840 Series SSD is hella fast, and less expensive than its 830 Series predecessor. The 3TB Barracuda hard drive is still the absolute best-bang-for-the-buck deal, as well. Finally, the longer legs of LGA2011 gives the quad 3820 part our nod over the 3770K.

ULTRA



EVEN THOUGH we're surrounded by gnarly PCs on a daily basis, we still get a bit tingly thinking about building a PC like Big Daddy Ultra here. The specs are awesome, for sure, but it's the towering Cosmos II chassis that lets everyone in its vicinity know they are in the presence of greatness. This system kicks so much ass, and there's so little competition in the rarefied air in which it exists, that it's likely we won't see any major changes to this build for a while. One likely change is the CPU cooler, which is currently the Corsair H100. The company just released the H100i model, which includes software control over the fans and pump, but until we review it we can't make an official swap. We could swap the PSU for a Corsair AX1200i, but why? The Thermaltake Toughpower is behaving perfectly for the time being. We'll probably be rocking the GeForce GTX 690 for quite a while, too, as AMD has yet to officially drop a dual-GPU board. We did make one change this month, though; we swapped the Samsung 840 Pro 256GB SSD for the Corsair Neutron GTX 480GB, as that SSD is the pinnacle of speed and capacity at the moment. Plus we felt that an Ultra rig's boot drive should be bigger than 256GB. We are currently testing the 500GB Samsung 840 SSD, though, so we'll see if it becomes our new OS drive soon.

For our complete Best of the Best list of recommended components, visit www.maximumpc.com/best-of-the-best.

INGREDIENTS

PART		URL
CASE	Cooler Master Cosmos II	www.coolermaster.com
PSU	Thermaltake Toughpower Grand 1050W	www.thermaltakeusa.com
Mobo	Asus P9X79 Deluxe	www.asus.com
CPU	Intel Core i7-3930K	www.intel.com
Cooler	Corsair H100	www.corsair.com
GPU	Asus GTX 690	www.asus.com
RAM	16GB Corsair Vengeance	www.corsair.com
Optical Drive	Lite-On BD-R burner	www.liteonit.com
Solid-State Drive	Corsair Neutron GTX 480GB	www.corsair.com
Hard Drive	Seagate Barracuda 3TB	www.seagate.com
OS	Windows 7 Professional 64-bit	www.microsoft.com

Approximate Price: $3,440

SUGGESTED PAIRINGS

Kick-ass peripherals for your new rig



MIDRANGE MONITOR
Asus PA238Q
$275, www.asus.com



AIR COOLER
Cooler Master Hyper 212 Evo
$35, www.coolermaster.com



WI-FI ROUTER
Asus RT-N66U Dark Knight
$160, www.asus.com



GAMING KEYBOARD
Corsair K90 Mechanical Gaming Keyboard
$110, www.corsair.com



MUSIC SPEAKERS
Bowers and Wilkins MM-1
$500, www.bowers-wilkins.com

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